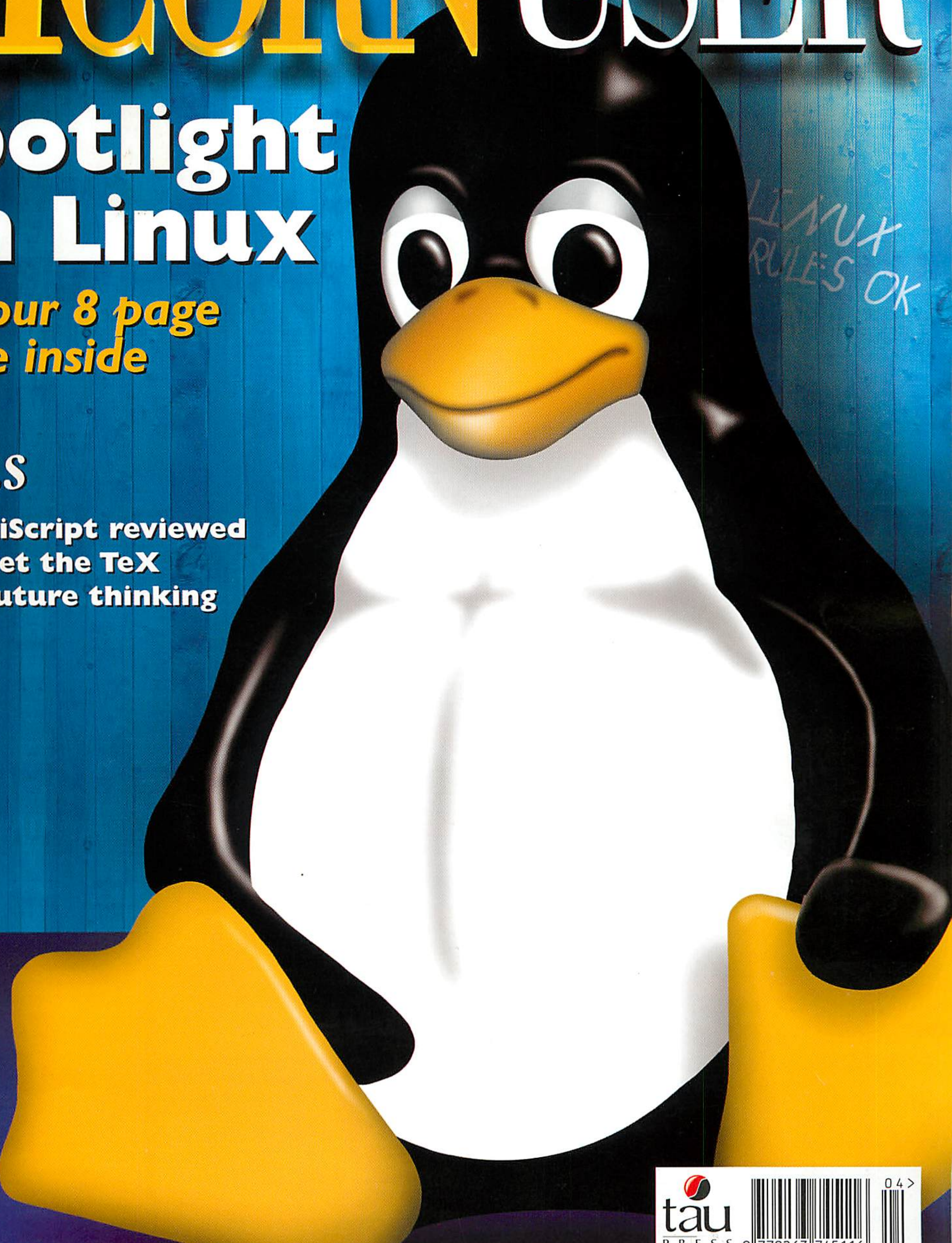
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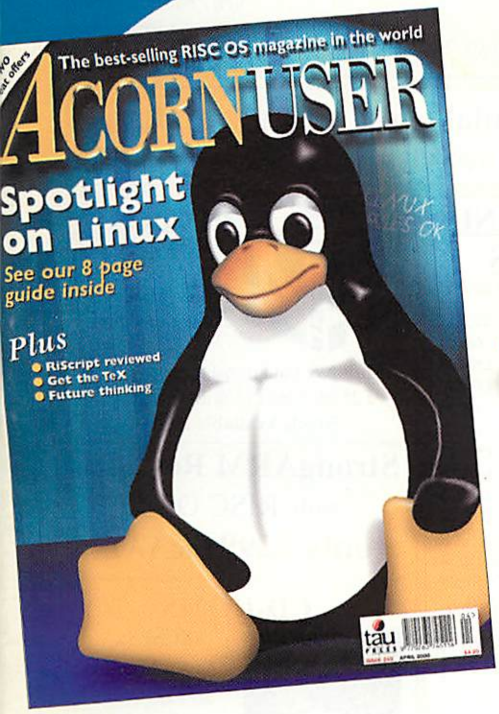
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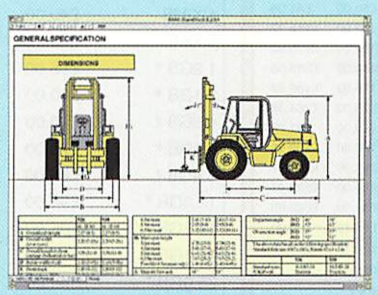
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April 2000

ACORN USER

Features



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RiScript review page 24

Hands-on

May issue on sale 13th April

Regulars

Specials

Linux User



Welcome to the April issue of *Acorn User* I'm happy to say that once again we've increased the size of the magazine – which just goes to show how much the market is expanding. Just think of us as a barometer.

Right about now we're all taking in a deep breath ready to hit the Wakefield Show in just 11 weeks as I write this, and about 8 weeks from the on-sale date for this magazine. This coming Wakefield show looks to be a really big one with a possible three new machines being released, maybe more, plus some very exciting, world-beating, software.

The May issue, next time, is a bumper CD issue which is stuffed to the gills with digital delights – currently we're just trying to figure out how we're going to fill the empty 70Mb that remains (yes we've nearly filled an entire CD).

But for now I hope you enjoy this issue with its brand new *Linux User* section and don't forget you can always write to us at *Acorn User*, we always like to read your letters.

Steve Turnbull
Editor

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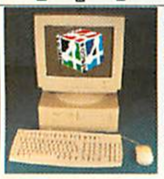
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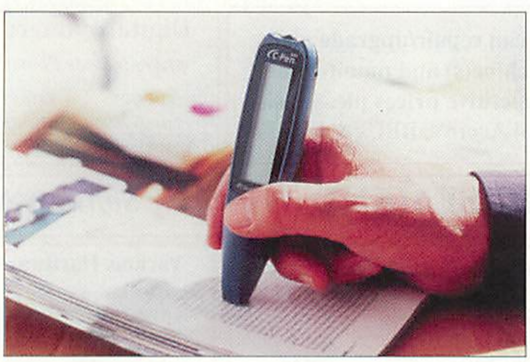
CeBIT preview

There are always lots of goodies most of us dream about and the occasional, lucky, *Acorn User* reader actually ends up owning, launched at the huge annual CeBIT fair in Hannover, Germany. We've been scanning the news releases for some advance news of the show, which takes place a month earlier than usual starting on 24th February.



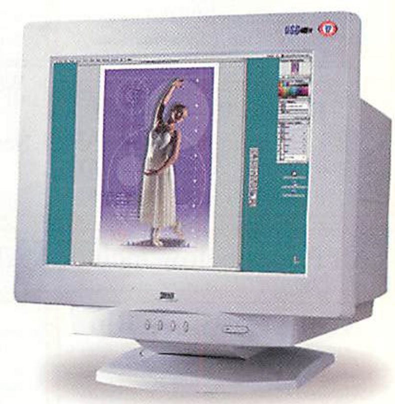
Digital cameras will hog much of this year's limelight. Last month we brought news of Canon's new 3.3 megapixel PowerShot S20. Fujifilm now looks set to steal Canon's thunder with its distinctive FinePix 4700 Zoom. This is the first production digital camera to use Fujifilm's new Super CCD technology. Ordinary CCDs arrange their pixel sensors in a square matrix. Super CCD sensors are arranged in a hexagonally sided honeycomb. Fujifilm says the 4700 has an image sharpness equivalent to a whopping 4.3 megapixels. It's also claimed that Super CCD technology provides better low light performance and colour reproduction.

Fujifilm will also be showing a 6 megapixel SuperCCD 'pro' SLR model which can take Nikon lenses. Agfa, on the other hand, has a digital camera notable for its reliance on mechanical, rather than solid state, image storage technology. It has produced a new version of its ePhoto CL30 digital camera model which is fitted with an Iomega Clik! removable disc drive for image storage. Each £10 Clik! disc stores up to 40 megabytes of data. This compares very well with the more usual Compact Flash or SmartMedia memory cards, costing £30-40 for just 8Mb of capacity.



StrongARM watchers will recall the C-Pen compact scanner launched at last year's show. This tubby pen device can scan and OCR printed sentences and transfer them to your desktop computer using a wireless IrDA link. The latest version, the C-Pen 800 will be launched at the show. Now they have managed to pack a GSM phone and a personal information manager into the device. It will also feature European language translation capabilities.

Finally, the piece de resistance – Seagate, famous for their speedy SCSI hard disc drives, have gone speedier still. Most run of the mill hard disc drives spin at 5,400RPM. Some are as slow as 4,800RPM. The better ones spin at 7,200 RPM and there are a few who followed Seagate's example a year or so back by introducing 10,000RPM drives. The rate at which the platters spin directly relates to the rate at which data can be read from the disc's surface. Seagate's Cheetah X15 drive whizzes around at no less than 15,000RPM. Now all you need is a SCSI interface which can keep up!



More photo-real drivers

Epson's Stylus Photo range of printers have won plaudits from reviewers for the last couple of years. No matter what Lexmark, HP or Canon (excepting their new BJC-8200 Photo) throw at the Stylus Photo, Epson always wins where photo quality is concerned.

At last, Stylus 750 and 1200 Photo RISC OS drivers and the printers are now available from Spacetech. The drivers take into account the variable dot-pitch and six-ink technology featured by Stylus Photo family. A colour calibration application, *PhotoReal* is supplied for the experienced user who may want to vary the fixed printer calibration settings.

The standard driver for plain paper printing at resolutions from 360 to 1440dpi is also provided.

Spacetech, Stylus Photo PhotoReal driver for £69 inc. VAT or with the A4 format Epson Stylus Photo 750 for £209.95 inc.VAT, or the A3 format Epson Stylus Photo 1200 for £399.95 inc. VAT. The proof is in the pudding, as they say and Spacetech will send you a sample printout if you request one.

Spacetech's Web site is at: **http://www.spacetech.co.uk** Spacetech can also be contacted at tel: 01305 822753, fax: 01305 860483, or e-mail: chris@spacetech.co.uk

OHP enhanced

In the PC world, the most popular presentation package is, inevitably, Microsoft *PowerPoint*. What's so striking about most *PowerPoint* presentations today is how bad they look.

Over ten years since anti-aliasing was introduced via RISC OS on the Archimedes, most PC users are either unaware of anti-aliasing or don't know how to make it work on a PC. So their presentations look horribly crude, with nasty saw-tooth graphics and text.

Presentations using packages under RISC OS, on the other hand, are usually delightfully smooth and sophisticated looking. So it's with great enthusiasm that we greet the arrival of a new version of Spacetech's presentation package, *OHP2*.

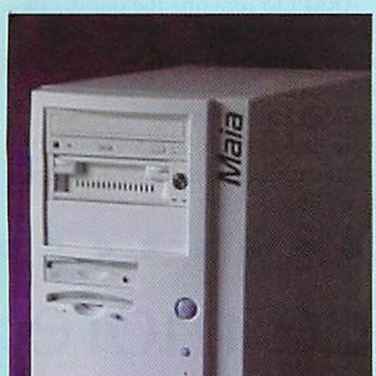
Artworks slides and backgrounds can now used, as can files created using Cerilica *Vantage* as long as you have a special *Vantage* renderer. Sounds can be associated with individual slides and play automatically, including looping. Formats supported include Wave, AudioWorks, Armadeus, DataVox, Psion and others. The desktop Preview also supports sound. The Gallery of slide backgrounds has been enhanced and there are additional dissolves and wipes.

There is also a unique new slide hopper facility. During a presentation this allows the presenter to skim through an on-screen display of the presentation and jump to whichever slide is desired, including hidden slides. Cross-platform support is now available, so finished slides may be exported to *PowerPoint* and other packages.

OHP2 is available on CD ROM for £39.95 inc.VAT and UK carriage. It requires RISC OS 3.5 or higher. Upgrades from *OHP* to *OHP2* cost 12.95 inc.VAT and carriage, just return your old CD.

OHP_show and a demonstration presentation is available for free download from the Spacetech Web site: **http://www.spacetech.co.uk** Spacetech can also be contacted at tel: 01305 822753, fax: 01305 860483, or email: chris@spacetech.co.uk





A small Australian bird sent us the following picture and some information about the new Maia machine. Based on the RiscStation R7500 board with tons of extra harddisc space, the new Maia is a file and print server for a small network – though with suitable software it could even be an e-mail server too.

ARM sponsors electronics awards

ARM has announced that it is to sponsor the Young Electronic Designer Awards (YEDA) for two years, starting this year. The YEDA programme sets out to attract more young people into information technology, electronics and communications careers. Those eligible for the awards include UK students between the ages of 12-25 who have developed their own product ideas using electronics hardware or software as solutions.

Robin Saxby, CEO and chairman of ARM, commented: "Digital electronics is a universal symbol of modern life which has influenced and changed many aspects of society including how we work, how we play and how we communicate. All this has created an explosion of market opportunities, driving the need for electronic inventiveness and business know-how. A programme like YEDA is critical to meet these needs, by capitalising on the talent and creativity of the next generation of UK engineers."

One of last year's winners was Nicholas Johnston. He was highly commended for his 'Lumi-Walker' – a lightweight illuminated walking stick designed to help the elderly or partially sighted.

The deadline for entries this year is 30th April. Regional judging is scheduled in May and the finalists' exhibition and awards dinner is due to be held at the end of June. Full details can be found at: **http://www.yeda.org.uk**

ARM breaks more records

ARM Holdings plc has announced a 47% growth in revenues and 91% increase in pre-tax profit for the financial year ended 31st December, 1999. ARM owns the rights to and designs many of the chips on which RISC OS runs.

The company, which has continued to be a star performer on the stock markets, saw revenues up 47% to £62.1 million (1998: £42.3 million), profit before tax up 91% to £18.0 million (1998: £9.4 million) and unit shipments of ARM-based devices more than trebled (51 million units in 1998 to an estimated 175 million units in 1999). In the fourth quarter alone, revenues up 52% to £18.9 million and pre-tax profit was up 119% to £6.6 million (1998: £3.0 million).

Commenting on the full year results, Robin Saxby, Chairman, President and Chief Executive Officer, said: "1999 has been a good year for ARM with volume shipments of ARM Powered products increasing from 51 million units in 1998 to an estimated 175 million units in 1999. This makes the ARM architecture the industry's leading embedded 32-bit RISC microprocessor core, and further demonstrates the enduring success of our partnership model.

"The range of products using ARM technology continues to expand into new areas including automotive applications such as air bags and braking systems, digital audio solutions and devices using Bluetooth. We announced collaborations with Ericsson, Intel, Lucent and Texas Instruments among others and we continue to expand the partnership with recently announced licensees ADI, Basis Communications and Mitsubishi."

Jonathan Brooks, Chief Financial Officer, added: "Royalty revenues grew throughout the year and this was the major factor in lifting operating margins from 18% in 1998 to 25% last year. Royalties were particularly high in the fourth quarter making up 23% of total revenues compared to 17% for the third quarter. While royalties continue to grow, with the ever-broadening range of technologies available to license, we still see licensing revenue continuing to be our major revenue stream."

Among ARM's many achievements and milestones in 1999, included the acquisition of Micrologic, a Cambridge-based development house and announcement of industry's first family of ARM Powered Ericsson Bluetooth cores. Bluetooth is a revolutionary digital radio technology which enables intelligent device-to-device communications without the need for bulky and inconvenient cables.

Other developments saw ARM chips at the heart of the MP3 Internet music revolution. The ARM9 generation gained enhanced signal processing capabilities and ARM10 products shipped for the first time in January this year. For the RISC OS community, most importantly, Intel underlined its commitment to the StrongARM platform, which it had acquired accidentally from Digital Semiconductor a couple of years previously.

Sadly, 1999 also marks the year in which Acorn, ARM's parent company, was liquidated, releasing almost a quarter of ARM's shares to Acorn shareholders – good news for many *Acorn User* readers in this sense, no doubt.

ARM Ltd remains the darling of the stock market. However, with a market capitalisation of several billion dollars, only those with privileged financial know-how can realistically relate the company's market worth with its much more modest, if rapidly growing, turnover.

It's Wakefield time once more!

The fifth annual Acorn RISC OS Show organised by The Wakefield Acorn Computer (User) Group will take place over the weekend of the 20/21st May. This year's show is to be called Wakefield 2000. The event will be held, as usual, at the Thornes Park Athletics Stadium, Horbury Road, Wakefield. The show will be open between 10.00 am and 5.30 pm on Saturday and on Sunday between 10.15 am and 4 pm.

Even as early as mid-February, the exhibitor list looked very healthy, with 46 stands booked up. All the usuals will be there, including Castle Technology, RiscStation Ltd and Cerilica. The latter will hopefully be showing and shipping a definitive 'final' release of their remarkable drawing a publishing package, *Vantage*.

RISCOS Ltd will be there too, complete with a prototype version of RISC OS 4 running on a Psion Series 7 sub-notebook. Meanwhile, our very own Mike Cook will be drawing the crowds to the presentation theatre.

Advance pre-booked tickets, which will admit holders 15 minutes before opening time, are now available from: Wakefield 2000, 95 Cumbrian Way, Wakefield, West Yorkshire, WF2 8JT. Adults/OAPs and Foundation Members £2.50, Juniors (under 17) £1.50 Under 5s get in free. Cheques and postal orders only please, made payable to "WACG". The final date for receipt of postal pre-bookings is Friday, 12th May.

At the Door ticket prices are: Adults £3.50, Juniors £2.50 Under 5s – free. Foundation members and OAPs £2.50 Tickets can be used on either day. The show Web site is at: **http://www.cybervillage.co.uk/acorn/wakefield**

RiscStation
Risc Based Technologies

We are proud to present the new RiscStation *R7500 Lite* . . . . .

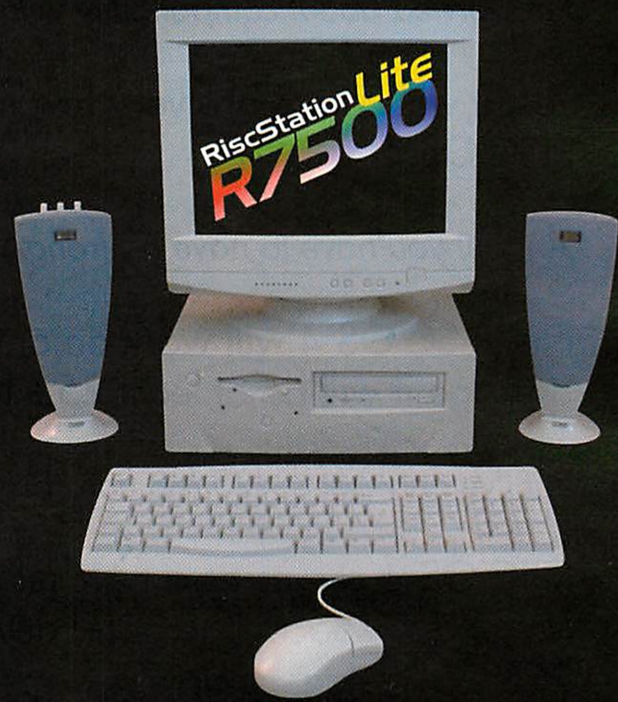
. . . . our new RISC OS 4 based computer that is about to break the hardware barrier set by previous compatible machines and take us proudly into the new millennium.

The RiscStation R7500 is a major departure from previous RISC OS compatible machines. Not only does the R7500 have RISC OS 4 (the latest version of the popular incorruptible operating system) built in, but also an amazing feature count only previously found on non RISC OS based machines.

Onboard 10baseT networking, full onboard 16bit sound sampling and mixing as well as a Midi controller and games port can all be found on even the basic R7500 Lite model. And with an affordable pricetag too, this makes the R7500 Lite the affordable alternative to other home, office or school computers.

So what of the quality of the machine? RiscStation do not believe in cutting corners, from design through to construction quality has been of upmost importance in order to provide a robust system with an expected lifespan far exceeding that of a non RISC OS based computer. Even the third party components have been carefully chosen to match the quality of the R7500 in performance and reliability.

"When you buy a RiscStation computer you will know that you have purchased a quality, British made computer that is second to none."



RISC OS 4
56 Mhz ARM7500FPE (with floating point co-processor)
16Mb 60ns EDO System Memory
4.3Gb EIDE Hard Drive
48X Atapi EIDE CD ROM Drive
Micro ATX Desktop or Mini/Midi Tower Configuration
Minimum 60 Watts External Stereo Speakers

2 x Serial Port **Rated at 460k baud*
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2 x High Speed EIDE Ports **Supporting up to 4 devices*
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Full 16Bit OPL3 Stereo Sound Sampler & Mixer with FM Synthesizer, Midi, Wavetable, 2 CD Mixer Ports 3 x 3.5mm Jack Sockets for Line in/Mic In/Headphone & Speaker Out

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3D Spatial Sound built in to the 16bit sound chipset for pseudo surround effects.

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www.riscstation.co.uk

Sounding out RISC OS

As featured last month in 'Tidal Sounds' (pp54-55), Julian Coleman, of City Audio Service, is a professional radio producer who is a keen Risc PC User. In the cause of Art, Julian used a Risc PC over the Millennium New Year to record the sounds of the River Medway non-stop for 12.5 hours.

Julian has been using Acorn computers since the very first BBC Micros were sold in 1982. His audio work includes some radio series which were combined with educational software releases by the BBC, including *Technology and Design*, *The Magic Theatre* and *Using Your Computer*.

These days, you are more likely to hear Julian's work on the BBC's World Service. His recent work there includes some segments of the *One Planet* series.

This month, Julian has announced that he intends to help boost the RISC OS platform as the one of choice for recording and editing broadcast-quality audio.

RISC OS may not at first sight seem to be the ideal audio platform, but as Julian explains: "The advent of the Irlam i16 which sports digital input/ output which can be coupled to external A/D and D/A hardware has given the platform new life in quality audio work and we are now working with others to create software tools to enhance its viability: initially a record and replay utility with dub-edit facilities and in due course a driver for Prosound. "

Julian adds: "As an audio production facility CAS can help with audio production work. We can also now supply RISC OS and other hardware, including ISDN audio codecs and advise on audio production for anyone else interested in using computers for audio work." Julian is very keen to hear from anyone who has a need for high quality audio recording capability using RISC OS: "If you want audio material created, or you want related hardware – ask us, we'd be glad to help especially if you are RISC OS fans!"

More of Julian's work on the World Service is in the pipeline: "We have now been commissioned to produce a six-part series on environmental matters to be broadcast in May and June.

'Facing the Future' will examine issues raised by the latest UNEP (United Nations Environment Programme) report called GEO 2000."

Julian can be contacted by phone, fax or ISDN at 01634 845878, or you can e-mail him at: **CAS@argonet.co.uk**

Power-tec acquired by author

Gary Partis is a very accomplished programmer. In his early days he wrote a string of games hits for the BBC Micro. Since then he has focussed on software development for various hardware products, including AlSystems' Power-tec range of products. These have now been acquired by Gary's company, Partis Computing (**www.partis.org.uk**). Gary says he will continue to support and develop the product range.

All existing support contracts will be honoured, plus the PowerChat mailing list is available, but users are required to re-subscribe by sending an e-mail to **mailserver@partis.org.uk** with the subject 'subscribe power-chat' (without the quotes).

RISCOS Ltd loses director

RISCOS Ltd's Technical Director and founding member, Andrew Rawnsley, has unexpectedly left the company. RISCOS Ltd's press release explains that Andrew has decided to leave of his own accord in order to pursue his own RISC OS-based software development business. Andrew is, after all, one of the main people behind R-Comp, one of the busiest RISC OS software houses.

Commenting on his departure, Andrew said: "I have very much enjoyed working with the RISCOS Ltd team for the past year, helping to build the company from a seed of imagination into a healthy, growing business. When we started, none of us knew what to expect, and what has been achieved in such a short space of time is phenomenal. Now I have seen RISCOS Ltd through its fledgling period, it is time to step back, and return to developing the supporting software to run on RISC OS."

Paul Middleton, Managing Director said, "I'd like to thank Andrew for his hard work over the last year, and wish him all the best for his future software developments – no doubt we'll be hearing much more on this soon!" Andrew will continue to attend User Group meetings as part of the RISC OS 4 Roadshow 2000.

Belgian group renamed

Here's one to ponder: would Hercules Poirot have used a Risc PC to help him solve murder mysteries if given half a chance? Who better than members of the Belgian Acorn/RISC OS User Group to pose such a question?

However, they are no longer called by that name – instead, they are now known as RISCOS.be. According to the user group, the new name is to reflect the new exciting developments around the RISC OS operating system. They also stated that, not wishing to deny their Acorn history and interest, they felt that a new name for the user group was necessary. Since September 1988 the Belgian Acorn/RISC OS users have been regularly meeting twice a month, first as an independent user group in the Belgian HCC (Hobby Computer Club) organisation and, subsequently, as a user group in the ACC (Algemene Computer Club) organisation together with other user groups like the Linux User Group, PC User Group and the Tandy User Group. Tandy?! Well, good luck to them! More information on RISCOS.be can be found at the temporary site: **http://gallery.uunet.be/john.tytgat/riscosbe/**

Drobe gets personal

Drobe Launch Pad, which claims to be the most frequently updated RISC OS news site, has launched a customisation system which allows every user to redesign the Drobe Launch Pad homepage to suit their individual needs. For example, you can choose the number of headlines to view under each category, how often the page reloads and the orientation of the features on the page.

According to Peter Price, editor of Drobe: "So far, options as complex as these have only been found on the larger, main stream portals and Drobe Launch Pad is delighted to bring this new technology to the RISC OS market. "We are confident that this advance in customisation makes Drobe Launch Pad the most technically complex RISC OS Web site in the world, as well as the most frequently updated."

Drobe Launch Pad has also announced a free prize draw in association with New Zealand-based Dansoft Developments (**www.dansoft.co.nz**), authors of the forthcoming *SiteWriter* Web page design program for RISC OS. Registering automatically enters new users into the draw to win a copy of *WebFX3D*, Dansoft Developments' advanced 3D graphics program for RISC OS. To register just go to **http://www.drobe.co.uk/**

Contacting AU

Ian Burley:
news@acornuser.com

Short wave Listeners tools

Hanno Schwalm, a RISC OS fan from Germany, has just completed a three year project to create a software toolbox for shortwave radio hams. It's called *SWL-Tools* (Short Wave Listeners Tools). Hanno says it's the first such toolkit for the RISC OS platform. In Hanno's own words: "Its main purpose is to support listening to weak and noisy radio stations from the far away parts of the world."

SWL-Tools is only for StrongARM Risc PC users at present. You will need 16Mb of free RAM, VRAM and an Irlam 24i16 card. The audio source is optional, but an AOR7030 radio is ideal.

The applications offers: real-time signal analysis using 1024-8096 point FFT, real-time audio processing with a 256 point adaptive filter, up to 6 individually programmed IFR filters, fully computer controlled radio, multisearch radio stations database, logbook keeping and weather FAX decoding, among others.

SWL-Tools can be downloaded from Hanno's Web site at: **http://pweb.uunet.de/schwalm.hb** free of charge. Support is available from: **support@schwalm.hb.uunet.de**

Published by

tau PRESS

26 Stockport Village, Hooper Street,
Stockport, Cheshire SK1 1DQ
e-mail: enquiries@acornuser.com
http://www.acornuser.com/
Tel: (0161) 429 8902 Fax: (0161) 429 0685
Printed by The Manson Group Ltd, St Albans

Editor: Steve Turnbull
Production Manager: Alan Jones
Art Editor: Anthony Broughton
Contributors: Simon Anthony, Alasdair Bailey, Ian Burley, Mike Cook, David Dade, Andrew Green, Alistair Lang, Thomas Leonard, Max Palmer, Jill Regan, Pam Turnbull, Paul Vigay
Account Manager: Geraldine Wolstenholme
Finance Manager: Amanda Betley
Subscription Manager: Richard Siggee
Distribution: COMAG (01895) 444055
Deputy Managing Director: Steve Turnbull
Managing Director: Sharon Henderson

Subscriptions:
0870 6060424
E-mail: subscrip@acornuser.com
13 issue subscription rate: £45.99 (UK), £51.99 (EU), £63.99 (World)

Acorn User is available as speech from the Talking Newspaper Association UK

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MicroDigital

mico computer

Quality Performance Expandability

The Microdigital mico sets new industry standards for small computers, delivering features which are unique in RISC OS land.

Whilst Mico is a completely new forward looking design it offers the user continuity with past hardware and software.

Mico is powered by the 56 MHz ARM7500FPE processor giving 50 MIPS performance with high resolution screen modes and a built-in floating point co-processor.

Excellence in engineering design, investment in leading edge technology combine with our zero defect quality assurance programme ensures Mico's high quality.

Mico is no lite weight computer, existing users of older Acorn machines can upgrade in full confidence that not only is Mico 100% compatible, but that it also offers a future proofed upgrade path.

Mico also has unique expansion capabilities, not only can it run existing Acorn podules, it can also run PC ISA cards and it has four USB ports. With all that expandability Mico sounds like a modern day version of the BBC model B computer.

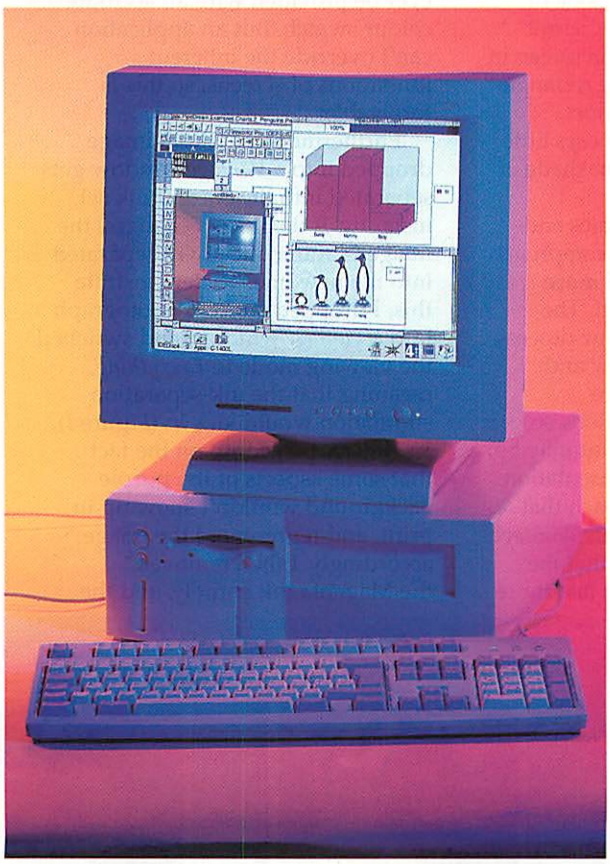
Mico has a completely standard implementation of the RISC OS operating system which delivers an easy to use, crash proof computer system packed with software that is ideal for the home, small business and education user.

ARM powered, RISC OS 4 computers

Telephone for full details and colour brochure or visit our website.
Educational discounts are available. Schools can register at our website to gain access to our education site.

Mico is designed and manufactured by MicroDigital Limited





Specification

56 MHz ARM7500FE Processor
(with floating point co-processor)
16MB EDO RAM expandable
to 256MB
5MB Flash ROM
6.4GB EIDE Hard Disc Drive
48x Speed CD ROM Drive(Optional)
4 USB Ports
3 MicroBus Slots
2 ISA Slots
2 High speed EIDE Ports
supports 4 devices
hard disc transfer rate 9MB/second
CD ROM transfer rate 4.5MB/second
2 Serial Ports
1 Parallel Port
1 PC Style Games port
with Midi IN/OUT
1 Microphone Port
1 Audio IN Port
1 Audio OUT Port
1 PS/2 RISC OS Keyboard
1 PS/2 Mouse
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wavetable
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Truism: A Taster

Pending the full release of Cerilica's much-anticipated *Vantage* vector graphics application, we thought we'd whet your appetite with a brief analysis of the system at the program's heart: TRUISM II.

The colour capabilities of *Vantage* extend beyond trying to provide extra features that other graphics packages may not have: they lie at the core of the application and to a large extent were its reason for being.

It's all too easy in *ArtWorks* to create a design that looks positively award-winning on screen, only to find that all the colours are hopelessly wrong on a printed version, especially when dealing with many shades of blue and purple. Most people do not understand that there are many RGB colours that just cannot be printed with CMYK colours. This is because *ArtWorks* (and it's far from alone in this regard) doesn't try to represent the colours of printed inks on screen in any convincing way. Draw a rectangle of solid cyan: the bright, almost fluorescent, colour you see bears little resemblance to an equivalent shade of solid cyan ink.

Many professional graphics and DTP applications take a raw approach to this sort of problem, and more often than not, it works well. The screen equivalents of the four process inks (Cyan, Magenta, Yellow and Black – known as "Key") are hardwired into the applications so that images destined for print may be given a more accurate representation on screen. This is the approach that *Ovation Pro* uses, for example. *Vantage* takes this a step further, in that the application is not limited to just those inks. You can define or redefine as many inks as you like, and then base your colour palette around them, allowing work to be created for inksets such as Hexachrome for the first time under RISC OS.

Vantage accurately represents the colour of the ink on screen by getting you to define a screen-colour for a full tint of the ink, plus opacity densities, ink print order and other factors at an advanced level can be taken into consideration. Obviously, this presents difficulties insofar as metallic, UV or fluorescent inks can't ever be provided with an accurate colour swatch. But an application can't override the inherent limitations of screens, so this is forgivable!

Furthermore, any RGB image dropped into a *Vantage* window gets separated into the current ink set instantly. If the ink set changes, the image is automatically re-separated into the new one. To demonstrate this, I dropped an RGB photograph into a *Vantage* window, and switched the viewing mode to *Everything*, meaning that the ink-separation simulation would kick in (Figure I).

Vantage picked up on the fact that some aspects of the purple background wouldn't show up in print, and represented the image accordingly. I then removed the Magenta ink entirely, and the image was redrawn to fit as best as possible the inks that were left (Figure II) – it should be clear that there's a slight difference in the purple background, although the skin tones remained relatively intact. I then removed the Yellow ink (Figure III), and the image was again redrawn into the two inks – Yellow and Black – that were left. It now bore little relation to the original image (how could it?), but I could see what I'm going to get, if I'd have printed it using only those two inks.

Lastly, I added a new ink: Purple. I chose this colour of ink because, theoretically anyway, it ought to replace many of the tones achievable by combining Cyan and Magenta. The finished representation (Figure IV) captures that admirably – although this magazine isn't printed with Purple ink so, strictly speaking, you can't see what I saw – so I hope that you'll be able to see how *Vantage* incorporated the available Purple tones back into the image to represent the original image in just those three inks as closely as possible.

This live-separation facility isn't just a feature that *Vantage* uniquely brings to the RISC OS platform: for the moment, no other software in the world is capable of allowing this kind of colour representation flexibility. Once again, we got it first.

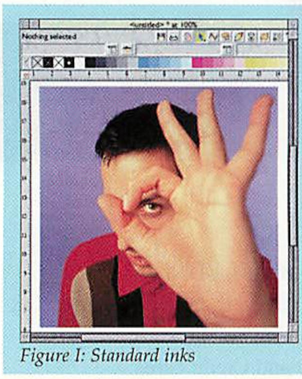


Figure I: Standard inks



Figure II: No magenta



Figure III: No cyan



Figure IV: Added purple

CompoScript

Automated image processing isn't something currently available under RISC OS. Jochen Lueg's *BatchFSI* comes close, by allowing certain *ChangeFSI* parameters to be applied to a whole group of images – but the kind of automation allowed by modern incarnations of *PhotoShop* has seemed a long way off.

However, following Rob Davison's impromptu announcement in the *comp.sys.acorn.apps* newsgroup that he has been working on a scripting facility for *Composition* (provisionally entitled *Nora* "'cos it'll drive Compo crazy"), this situation looks like it's on the brink of change.

Scripting facilities in image manipulation programs allow for a whole range of effects to be applied consistently to a number of images – for example, a selection of images could all be scaled down, sharpened, a drop-shadow applied, and a text overlay created in a consistent position; the images then saved out in a different format – all by creating a single script and then applying it to any given selection of images.



The syntax for *CompoScript* may change radically in the process of reaching a production version, but Rob has plans – eventually – to allow for *Compo* to record changes made to one image, and then to repeat those manoeuvres on another image: in a sense allowing for *CompoScripts* to be automatically generated, and bringing another dimension to one of the most rapidly developing graphics applications under RISC OS.



Pic of the month

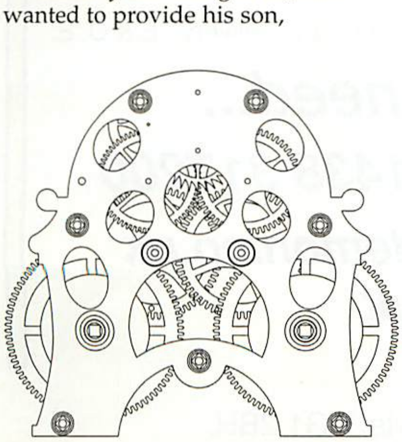
An interesting submission this month, coming from Geoffrey Booth of Dorset. Geoffrey and his son are clockmakers, specialising in cutting gears for clocks and small mechanisms.

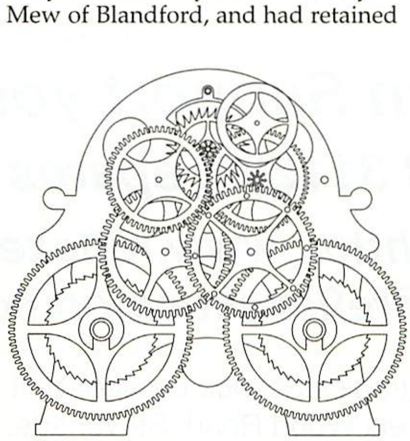
Geoffrey is retiring soon, and wanted to provide his son, Christopher, with a new logo for use on his business stationery and the like.

Twenty years ago, when Christopher was beginning his apprenticeship, they restored a small early 19th Century stable clock by Mew of Blandford, and had retained the dimensions and a number of photographs of the clock. Geoffrey decided to use a picture of this clock as the logo device, and drew the separate components in *WorraCAD*.

Apart from the complexity of the gear system (Geoffrey points out for the benefit of discerning readers that some components are purposefully missing), the difficulty came in preventing elements that were overlapped by others from being rendered fully. By manually deleting those sections, Geoffrey was eventually able to complete the logos as shown – a front and rear view.

Keep those entries rolling in.





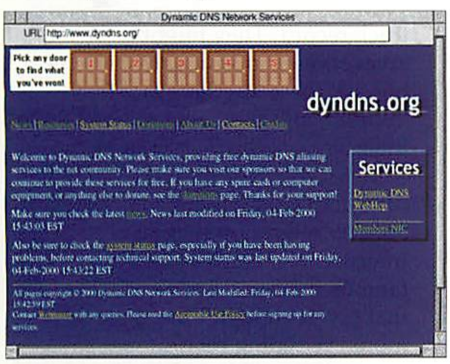


Andrew Green:
graphics@acornuser.com

Dynamic duo

Most Internet Service Providers in the UK allocate an IP address or network identity to your computer dynamically when the call starts, from a small number of addresses. This makes it tricky to offer access by other users to your computer using a registered domain name which is normally associated with a fixed IP address.

Dyndns.org is a volunteer organisation led by Tim Wilde of Orwego, New York, USA with a simple solution. They operate their own Domain Name Server (DNS) and offer members free subdomain names. As a member, you can go to their Web site



and set your chosen domain name's associated IP address via an online interface to the dynamic address given by your ISP to your computer.

Client programs to do it all for you have been written for most platforms, and there is indeed a RISC OS Client called *!DynDNS* which can be downloaded from the dyndns.org Web site. Although he wanted to remain anonymous, Justin Fletcher is credited on the download page as the author.

!DynDNS is run immediately after successful connection to an ISP, and contacts dyndns.org over the Web and sets your dyndns domain name to your current IP address for you. Until you log off, or the ISP changes the address, your machine is accessible to the world by name.

To complete the dynamic duo of dyndns.org services, their new WebHop re-direction service allows you to set a nicer-looking or more easily memorable URL for a Web site. So the site **http://www.ndirect.co.uk/~thecommspage/** could become **http://commspage.webhop.net/.**

Dynamic DNS Network Services
http://www.dyndns.org/

Your number's up

Considering British Telecom's position as a major telephone service provider, it's surprisingly difficult to locate the information about the impending OFTEL number changes on BT's Web site at www.bt.com. Although those who receive a BT phone bill will have had enclosures about the changes, if you haven't taken it in, the Big Day will be upon us on 22nd April 2000.

The main changes affect subscribers in Cardiff, Coventry, London, Northern Ireland, Portsmouth and Southampton, where new area codes and eight-figure local numbers are introduced. Local number changes for London have confused some people in the way they have sometimes been laid out incorrectly in print. As an example of the right layout, the main Arcade BBS London phone number was 0181 654 2212. It has now become 020 8654 2212, so a London-based BBS user whose own area code is 020 could just dial 8654 2212 to connect. In other words, the area code changes from 0181 to 020, and the Arcade number is prefixed with 8; similarly all 0171 numbers become 020 7XXX XXXX. The Cardiff area code becomes 029 with 20 added to the six digit subscriber's number, Coventry becomes 024 with 76 prefixed, Northern Ireland becomes 028 with 90 prefixed, Portsmouth becomes 023 with 92 prefixed, and Southampton is 023 with 80 prefixed. Some mobile, pager and premium rate numbers are changing too, so to avoid that plummy "Sorry – the number you have dialled has not been recognised", you can find all these details at **http://www.numberchange.bt.com**

In brief

Bob's listed links

Bob de Jong's Web site is an Acorn island in the vastness of the Internet. His Acorn links page brings together more than 200 sources of software from *Attacher* to *Zap*, and dealer sites from *Aleph 1* to *Zynet*.

Bob's lists of other links cover almost any subject from the Trojan Room Coffee Machine Webcam to the Museum of Dirt, and his growing Index Page of Internet Shopping is worth a visit.

Bob has been using and programming Acorns ever since BBC 'B' days in 1982, so his choice of links comes with a long pedigree.

Bob's Links
http://www.ebctsh.freeuk.com/acorn.htm

Cook the books

***!BookMaker* by Nick Roberts is a stand-alone version of his address book application written for the *Argo Voyager Suite*.**

***BookMaker* is compatible with Hotlist files from *ArcWeb, WebsterXL, Fresco* and *Browse* and with the e-mail address books of *Posty, Messenger* and *Marcel*.**

***!StrongMen* by Guttorm Vik adds a number of other features to its bookmark list facility, including launching applications, showing a history of recent files and a listing of currently open files.The *StrongHelp* instructions included explain how to customise *StrongMen*.**

!BookMaker by Nick Roberts
http://www.argonet.co.uk/users/tigger/

!StrongMen by Guttorm Vik
http://login.eunet.no/~guttorvi/strong.html

Contacting AU
David Dade:
comms@acornuser.com

BackMan

BackMan is another application that no one should be without: It's a hard disc backup program, which is something often overlooked – until it's too late. The fact is, you never know when you might accidentally delete a vital file or get the dreaded 'Broken directory' error.

Before crying after the event has happened, whiz over to Matthew Sackman's web site at **http://www.sackman.co.uk/namkas/** and see if *BackMan* will cater for your needs. It's very easy to setup and use, yet contains a number of choices to suit all requirements.

If you, like me, can't remember the last time you made a backup then *BackMan*'s automated timer will take care of things for you. From *Backman*'s comprehensive configuration you can specify a time delay of anything from an hour up to a year between backups.

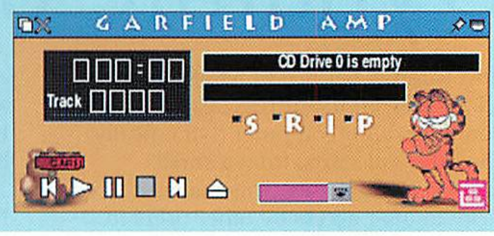
BackMan even puts a countdown timer on the iconbar to remind you how long it is before the next scheduled backup. You don't need to backup the whole disc either, as *BackMan* can be configured to save only those files with a newer datestamp or files that are bigger from those stored at the previous backup.

One very flexible feature is the ability to store up to 50 backup definitions consisting of source and destination directories. This gives you the added flexibility of specifying exactly which directories you want backed up, and to where. As *BackMan* copes with all types of media, from SCSI drives to parallel port Zip, Jaz and Syquest drives you shouldn't have any worries about your important data going missing.

Although there is enough choice and flexibility to keep even the most demanding user happy, BackMan's main attribute is the peace of mind it gives you from knowing that your data is safely backed up. This reassurance is one thing that should encourage you to visit Matthews web site and download a copy. BackMan is shareware so encourage Matthew's future RISC OS software by registering now.

DigitalCD

Since featuring in last months column, Andre Timmermans has updated *DigitalCD* again. Now at version 2.46 it offers improved playback for MP3 tracks, using *AMPlayer*. If you pay another visit to Andre's web site at **http://www.geocities.com/SiliconValley/Horizon/4471/dev.html** you'll also find that there is a rapidly growing collection of colourful and wacky skins developed especially for DigitalCD format by Andrew Hill.

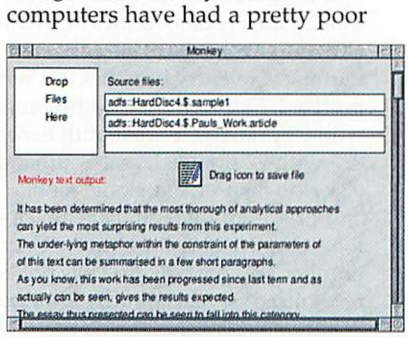


Monkey

One aspect of computers that programmers have striven for is the ability to fool other people into thinking that their program is somehow 'intelligent'. One of the first software applications to demonstrate this was the famous 'Eliza' program of the 1970's.

This simulated a simple dialogue between the operator and a computer "psychologist". By learning key words and phrases, the computer could carry out a very rudimentary conversation with the operator, and even answer simple questions.

One of the inspirations behind artificial intelligence was Alan Turing, who devised what has been known as the Turing test. To pass the Turing test, a computer program has to be sufficiently intelligent enough to fool a person into not being able to determine whether their 'interview' is with a computer or another human being. Suffice to say that so far, computers have had a pretty poor track record. They might be able to answer questions in parrot fashion, but ask them anything emotional or 'human' and they immediately show their weaknesses.



Enter *!Monkey*.... I discovered this little gem of A.I. while idling away a Sunday afternoon surfing around the Internet. The name is inspired by the famous mathematical proposition that given enough time, a group of monkeys typing randomly on a typewriter could produce the works of Shakespeare. *!Monkey* will be ideal for academics and journalists alike, who are short of that elusive last page of text, and past their deadline.

Put simply, you just drag a selection of text files to the main window and *!Monkey* then analyses the words within the text in order to 'understand' your writing style. After a few moments of calculations, *!Monkey* displays a randomly generated document emulating your own writing.

As can be seen from the screenshot, it's made a few trips here and there, but the resulting output should keep your lecturer or editor happy, when you've been down to the pub and forgotten to write your important assignment or you're *right* on deadline. In fact this story is a slightly tweaked example of *Monkey*'s output.

!Monkey is available from **http://www.red-squirrel.com/AF.html**

PlaySound

There are a few applications in the world of RISC OS public domain and shareware which are so useful you can be mistaken for wondering why they are not integral to RISC OS itself.

PlaySound is just such an application. Written by Mark Scholes, *PlaySound* is a RISC OS front-end for Rick Hudson's *PlayIt* module and as such, I shall be looking at them both here.

PlayIt is a disc-based engine for playing sound samples and supersedes *SoundCon*, which many users regard as the 'definitive' sound file player – an audio version of *ChangeFSI* if you like.

The latest version of *PlayIt* is installed into your resources directory and becomes a system-wide resource, in the same way as *!Fonts* or *!ARMovie*. Supporting Armadeus, ARMovie, Audio IFF, AudioWorks, CD Audio, Creative Voice, DataVox, IFF/8SVX, Infocom, Psion A-law, SunAudio, Symphony samples and, most importantly, the popular WAV formats, *PlayIt* is unrivalled in terms of multi-format sample playback.

Rick's *PlayIt* module has it's own set of SWI calls and programmer notes so that it is easy to incorporate it into other applications. This enhances it's use as a shared system resource and avoids applications having to implement their own sample play back routines.

Indeed, software such as Web browsers and multi-media software often call *PlayIt* whenever a sound sample or effect is required.

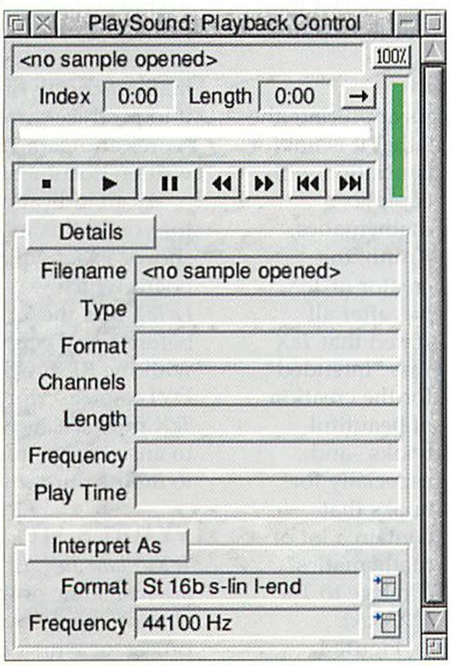
Going back to *PlaySound*, we find that the user interface is very similar to the original *SoundCon* look-and-feel. This means that new users will immediately find their way around the controls. *PlaySound* can interpret sound samples using just about every conceivable format and frequency, so you'll find that if *PlaySound* won't play it, it's generally a bad sample file.

Although *PlaySound* has a whole repertoire of controls and features, the *PlayIt* module is pretty intelligent at auto-detecting the sample you throw at it, so in reality you can generally forget you've got it installed – until of course you hear your speakers blast to life! It will drive 8-bit, 16-bit and even Lark audio cards so is an essential application for all RISC OS users.

One useful feature of *PlaySound* is the ability to queue sound samples and even whole directories of samples. This allows you to play them one after the other.

The latest version (available from Mark's Web site) supersedes a version that was bundled on the RISC OS 4 CD, which had a minor bug in the queuing.

There really is no excuse for not getting copies of both *PlaySound* and *PlayIt* and making them a permanent part of your RISC OS installation. *PlaySound* is available from **http:// www. markscholes. freeserve.co.uk/ software.html** and *PlayIt* from **http:// members.xoom.com/ _XOOM/rick_hudson/ software /playit.html**



The main control panel – fully opened

Easter egging

By the time this issue hits the newsagents, Easter will be less than a month away? How do I know that? Indeed, how does anyone know that? *Easter*, as everyone knows, tends to fluctuate from year to year – it's one of those movable feasts – and if you're not religious or astronomically minded you might wonder how its date is determined.

According to the Encyclopedia Britannica Easter is defined as the Sunday immediately following the (Paschal) Full Moon that falls on or after the vernal equinox, taken as March 21st. The church also ordered that if this full moon fell on a Sunday, the festival should be held seven days later.

Of course, this gives mathematicians and computers something of a headache when trying to fit it into a convenient formula. However, believe it or not, there is a mathematical way of calculating when Easter will fall in a particular year.

I won't bother people with a technical description, suffice to say that if you want the full mathematical equation (together with a host of other useful astronomical formulae) I can recommend the book "Astronomical Formulae for Calculators" by Jean Meeus.

Luckily, RISC OS users don't need to resort to calculators and notepads, as Omer Roucoux has written a program to tell you what day Easter lies on for any year you specify – thus without consulting my diary I know that Easter Sunday this year is April 23rd – also demonstrating that Omer's program is Year 2000 compatible.

Easter is available to download from **ftp://ftp.argonet.co.uk/ pub/Acorn/PD/Education/**

Contacting AU

Paul Vigay:
pdpage@acornuser.com

Non-technical TeX

Paul Webb explains it all

Have you ever thought how pleasurable it would be to use an application which was capable of typesetting (not just printing) beautiful text, complex equations and stunning graphics? If you have, then read on! The program in question is called *TeX* and it is available for RISC OS for free.

Just a quick word on pronunciation: The X is the Greek letter Chi, and the whole thing is pronounced "tek". In this article, I will take you on a guided tour of the *TeX* world as a prelude to showing you how to typeset a complex document fragment in the second part next month.

The most distinctive feature of *TeX* for the new user is that it does not use the WYSIWYG method of producing documents. In order to work with *TeX*, you initially employ a text editor – like StrongEd or Zap – to compose a document which is interfaced with *TeX* control symbols or control words. The completed document is then given the *TeX* or *LaTeX* filetype (more on this later) before running it through the *TeX* 'compiler' to produce a Device Independent or DVI file, a log file and an aux file.

The log file is simply a record of your session and the aux file contains *LaTeX*-related cross-referencing information. The DVI file can either be printed as is, viewed through a DVI previewer, converted to PostScript or, alternatively, saved as a Drawfile. Of course, this is a simplification of the actual process in action but you should get the general idea.

But isn't this a very painful way of producing documents which moves away from the RISC OS ethos of creating apps which are accessible to all? Well the honest answer to this question is a tentative 'yes' and 'no'. It can sometimes be difficult to imagine what your completed document will look like prior to compilation, but this difficulty is becoming less of an impediment as RISC OS machines become more powerful.

There are also many plus-points in *TeX*'s favour including its cross-platform availability, the device independence of the DVI file, price (zero), extensibility and the fact that it produces such beautiful output.

Is TeX for me?

Many computers users appreciate the power of *TeX* but feel that it is not for them because of its association with complex mathematics. Knuth, the creator of *TeX*, has after all stated that *TeX* was "intended for the creation of beautiful books –and especially for books that contain a lot of mathematics" (Preface to *The TeXbook*).

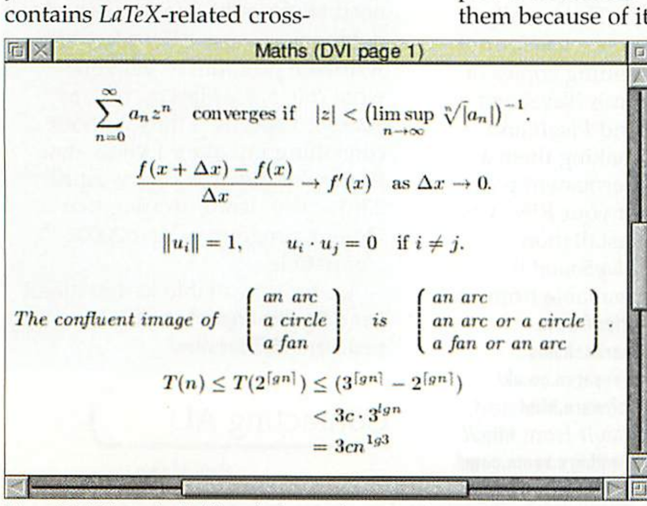


Figure I: TeX is unrivalled if you're into maths typesetting

Figure I shows just one small example of *TeX*'s mathematical capability. But Knuth also stresses the aesthetic dimension of document production. He called the program *TeX* because of the Greek word 'techne' which signifies both art and science. Consequently *TeX* should be of use to scientists and to the non-mathematically-inclined who can use it to produce drawings, musical scores and game boards as well as written documents.

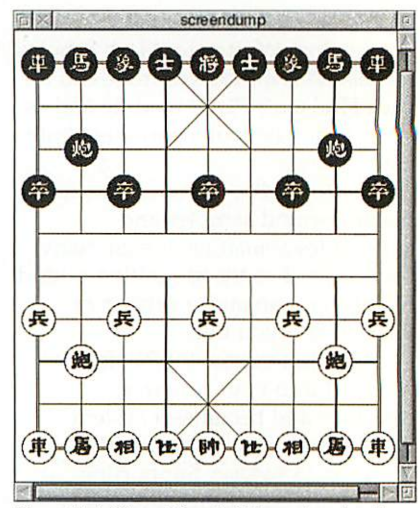


Figure II: A Xiangqi Board. Chinese chess has the same origins as European chess

As an indicator of what's in store for you in this mini-series, Figure II shows a Xiangqi or Chinese Chess board which was produced with *LaTeX* and the 'cchess' package before being converted to PostScript with the RISC OS port of *dvips* – a DVI to postscript driver. But how can *TeX* produce such a graphic? In order to answer this question, we will need to define our terms.

What's in a name?

TeX, *Plain TeX*, *LaTeX* and 'package' are just some of the terms that I have already mentioned. *TeX* is a macro processor which is hellishly difficult to use on its own with the result

that Knuth developed *Plain TeX*. *LaTeX*, in contrast, is a *TeX* macro package by Lamport which attends to the structural features of a document (section, subsection and so forth) and thereby allows the user to concentrate on content as opposed to form whereas a *LaTeX* package gives *LaTeX* additional capabilities which would not be present in the base system.

The 'cchess' package which we have used to typeset a Xiangqi board therefore allows the user to access a Metafont called 'cchess46'. *Metafont* is a companion program to TeX which deserves to be more widely known than it is by users. It is perhaps easiest to think of *Metafont* as a programming language which allows the user to design fonts by mathematical means.

Indeed, Knuth used *Metafont* to design the "Computer Modern" range of fonts. So we now know what *TeX* is and have an understanding of some crucial *TeX*-related terms. But what about my apparently curious predilection for writing *TeX* and *LaTeX* with a mixture of upper and lower-case letters? Quite simply, *TeX* is written with an upper-case 'T' and 'X' in order to set it apart from TEX – the Text EXecutive processor of Honeywell Information Systems. Lamport has merely continued with the tradition.

Plain TeX or LaTeX?

Should you use *Plain TeX* or *LaTeX*? The pragmatic answer to this question is to use what those around you are working with. If you don't have the advantage of a tame *TeX* aficionado to hand, then *LaTeX* is probably easier to get to grips with. Insofar as your choice of editor is concerned, use the one that you are already working with.

StrongEd, *Zap* and *VIM* for RISC OS all seem excellent because they offer syntax-colouring modes which make it easier to debug your code. If you do any work on the PC Card, GNU *Emacs* in *AucTeX* mode or *WinEDT* are of equal worth although you will have to pay a small fee for the latter.

Where can I get TeX?

TeX will be available on Acorn User's May CD as well as from APDL and the ARM Club. If you have Internet access, TeX can also be downloaded from HENSA (**http://www.mirror.ac.uk/collections/hensa-micros/local/riscos/textprocess/**) or from the armTeX Web site at **http://omega.barnet.ac.uk/pub/Acorn/armtex/** If you have a PC Card, you can also take advantage of MikTeX, fpTeX or emTeX which are available for download from the Comprehensive TeX Archive Network or buy one of the CD-sets which are available from a TeX Users' Group.

I particularly like *emTeX* because of its ability to generate fonts which are not present on your system using its 'mfjob' facility).

The TeX Live CD is for example distributed by the international TeX Users' Group (**http://www.tug.org**), UK TUG (**http://uk.tug.org/**) and GUTenberg and is freely available to group members.

Alternatively, Deutschsprachige Anwendervereinigung TeX e.V. (**http://www.dante.de/**) have produced a three CD set which mirrors CTAN and contains *armTeX* release two as of May 1999.

If you must use Windows, check out *4AllTeX* by the Dutch TeX Users' Group. Many other *TeX*-related sites including those of the national users' group and CTAN can be accessed from the main TUG site.

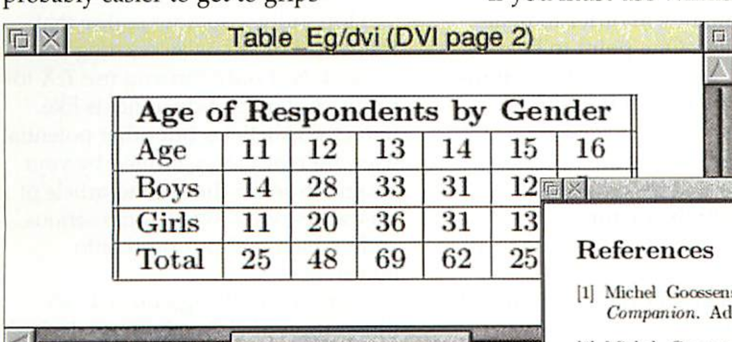
armTeX

TeX for RISC OS is available as *armTeX* 3.141 release 2 and as *armTeX* 3.14159 release 3. The latter distribution is more current but you should use which ever release you prefer or can get hold of. *ArmTeX* release 3 now adheres to the *TeX* Directory Structure (TDS) – a standard way of organising a TeX system irrespective of platform – and uses a range of Pineapple registered filetypes for the many *TeX*-related files that you may need.

If you decide to migrate from the second to the third release you will have to reassign your filetypes but this can be done with a BASIC program which is supplied with the later release. *ArmTeX* release 3 also takes advantage of filenames which are longer than ten characters. In the absence of RISC OS 4, you will therefore need to acquire *raFS* (**http:/www.informatik.tu-muenchen.de/~atterer/riscos.html**) or *LongFiles* (**http://www.tribbeck.com/longfiles/**).

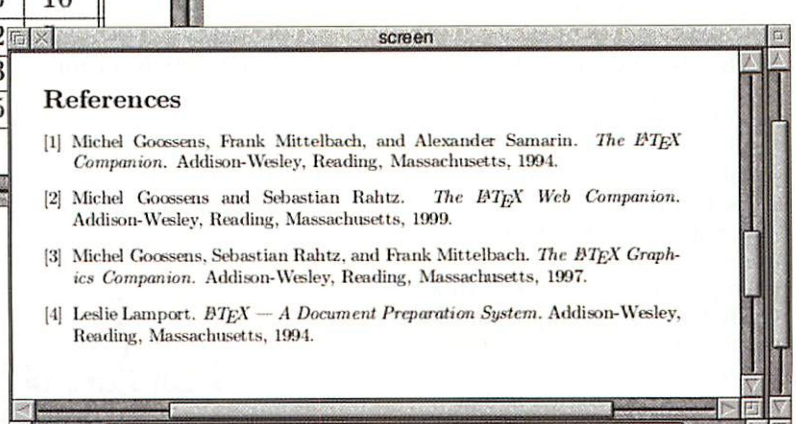
The file 'Changes/tex' by Jakob Stoklund Olesen which is bundled with release 3 describes the differences between releases 2 and 3. Release 3 also comes with a number of documents which should be essential reading during your early adventures with *TeX*. Look at the 'ReadMe' file and the 'ReadMe-Watts' file which are both very informative.

Insofar as installation is concerned, *armTeX* release 3 stores the complete distribution in a number of zip files. Base.zip and dviview.zip are essential as are some fonts and latex.zip is also a must if you want to avail yourself of a pre-installed version of *LaTeX2e*. What



Age of Respondents by Gender						
Age	11	12	13	14	15	16
Boys	14	28	33	31	12	
Girls	11	20	36	31	13	
Total	25	48	69	62	25	

Figure III: Generating a table with LaTeX



References

[1] Michel Goossens, Frank Mittelbach, and Alexander Samarin. *The LaTeX Companion*. Addison-Wesley, Reading, Massachusetts, 1994.

[2] Michel Goossens and Sebastian Rahtz. *The LaTeX Web Companion*. Addison-Wesley, Reading, Massachusetts, 1999.

[3] Michel Goossens, Sebastian Rahtz, and Frank Mittelbach. *The LaTeX Graphics Companion*. Addison-Wesley, Reading, Massachusetts, 1997.

[4] Leslie Lamport. *LaTeX — A Document Preparation System*. Addison-Wesley, Reading, Massachusetts, 1994.

Figure IV: BibTeX generates references using the 'Plain' style

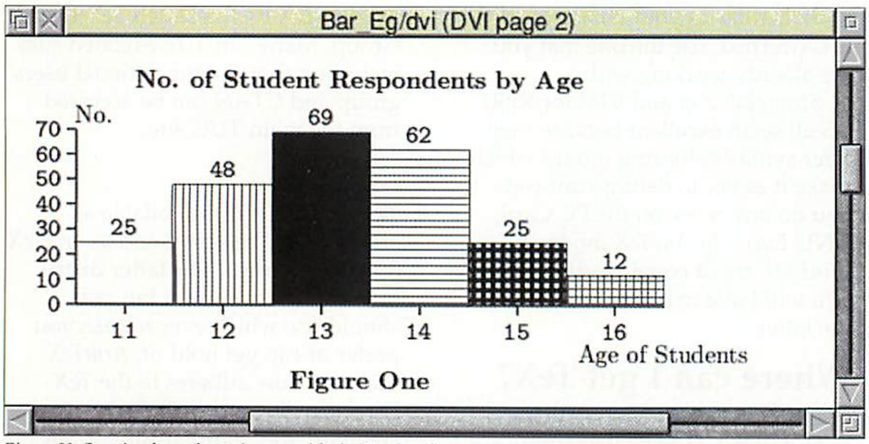


Figure V: Creating bars charts is easy with the 'Bar' package

else you choose will of course depend upon your intentions. Mathematicians will appreciate ams.zip which contains mathematical typesetting tools while users of 4Mb machines will be grateful for the inclusion of lowmemory.zip.

A new DVI previewer – *SeeDVI* – has also been made available by David Bryan in order to build upon the precedent set by Paul Field's *DVIview*. *SeeDVI* doesn't, as yet, have a print facility but it is very fast, supports colour, and is still under development.

David Bryan's port of dvips is also available for those who have need of PostScript. If you have *armTeX* release 2, unpack at least *TeXBase1*, *TeXBase2* and *TeXFnts1* to 5 as well as *DVIview* into the same directory. If you have an aversion to running an app through the Task Window, take advantage of *SemTeX* or *DaTeX* – two user-friendly WIMP front-ends for *TeX*.

What can TeX do?

We've already seen that TeX can be used to generate text, mathematics and more exotic creations like the Xiangqi game board but what about tables, graphics and a bibliography for those long documents?

TeX is more than a match for all of these tasks. Figure III shows a table which was generated with the *LaTeX* tabular environment. Don't worry about the meaning of the phrase 'LaTeX environment'. All will be revealed in the second article of this series. Figure IV also shows a bibliographic fragment which was produced with *BibTeX*. *BibTeX* is a bibliography generator for *LaTeX* which uses a bibliographic database to generate a bibliography in a style of your own choosing.

The beauty of *BibTeX* is that the database is simply a plain text file which can be exchanged very easily with friends or colleagues irrespective of the computer system that they use.

So yet another example of RISC OS computers working successfully with the outside world. Your choices are similarly many and varied when it comes to including graphics in your *LaTeX* documents.

The new user could use the *LaTeX* picture environment or perhaps Joachim Bleser's Bar package which extends that environment (Figure V). Alternatively, one could use a dedicated drawing package with an additional set of fonts like Kristoffer Rose's *Xy-pic* package or go for an external drawing program which has a *LaTeX* driver facility. *Gnuplot* for RISC OS is an example of just such a program.

Gnuplot provides 2D and 3D plotting facilities and comes with *LaTeX* and *Metafont* drivers. Finally, one could simply stick with the colour, graphics and graphicx bundles which come with *LaTeX2e* or make use of a number of RISC OS specific\special commands. *SeeDVI* makes use of RISC OS specific special commands in order to deal with Drawfiles. One point to bear in mind is that you should always think in terms of the portability of your files.

Special commands are notoriously non-portable whereas drawings produced with the picture environment will be acceptable to all *TeX* systems.

PostScript and Portable Document Format (PDF) files are also very readable across platforms and if these formats are what you require, learn how to use *dvips*, *GhostScript* or *MetaPost* – a *Metafont*-like programming language which generates PostScript rather than bitmaps.

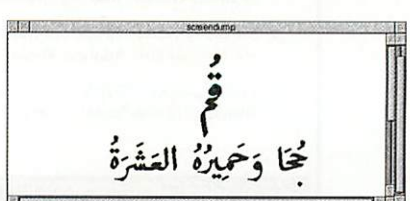


Figure VI: LaTeX speaks in tongues

Skeleton LaTeX

So without further ado, let me introduce you to *bones/tex* – the bare-bones of a *LaTeX* document which we will be using in the second article.

```
    % Name of File Bones/Tex
    % \newcommand{<\NameNew
Command>}{text}
    \documentclass{article}
    \usepackage{...}
    \begin{document}
    % Type whatever suits you here.
Try typing \LaTeX\ to see what
happens.
    \end{document}
```

LaTeX documents tend to follow much the same pattern. Any text after the percent sign is ignored by the *TeX* compiler so you can write what you like. Such a facility can be useful if you have a poor memory and need to remember the syntax of a particular command. The second line consequently reminds the user how to use the \newcommand facility. The actual code begins with a \documentclass command with 'article' as the argument of the command. Other possible arguments for this command include book, report, letter and slide. The area in between \documentclass and \begin {document} is known as the 'preamble' and is the place to insert a \usepackage command. Finally, any marked up text is placed in between the \begin {document}...\end {document} pair.

Hopefully, you now realise that the world of *TeX* is an exciting one to inhabit. Not only can you use *TeX* to produce standard documents like letters and articles but other potential uses are really only limited by your imagination. In the second article of this series, we'll write some serious code which will put flesh onto bones/tex.

Until then, I'll sign off with an illustration of *TeX*'s ability to deal with non-Latin scripts. Figure VI shows a short piece of Arabic which was produced with *LaTeX* and *ArabTeX* – a package which extends *LaTeX* via a series of macros and a *Metafont* Naskhi font. Limited support is also available for Farsi, Urdu, Pashto and Maghribi. Far out! Until next time, Happy TeXing.

END

Catcher

Alasdair Bailey explores the RISC OS application that gives more connectivity

PDF (or Portable Document Format) files have become a very popular electronic publishing medium. The format is heavily supported by Adobe whose freeware *Acrobat* PDF reader can be found on just about any PC or Mac.

Unlike HTML as is used on the WWW, the PDF format allows all formatting data in the original file to be preserved. This means that the resulting file should look the same irrespective of whether it was generated by PC, Mac or now even RISC OS software.

This all sounds too good to be true; for years RISC OS users have grappled with an immense range of different file format conversion applications to create files readable on other platforms. *RiScript* from Cerilica aims to change all this by allowing RISC OS users to produce PDF files from all applications which use the standard Acorn printer driver. PostScript files from other sources can also be interpreted by *RiScript*.

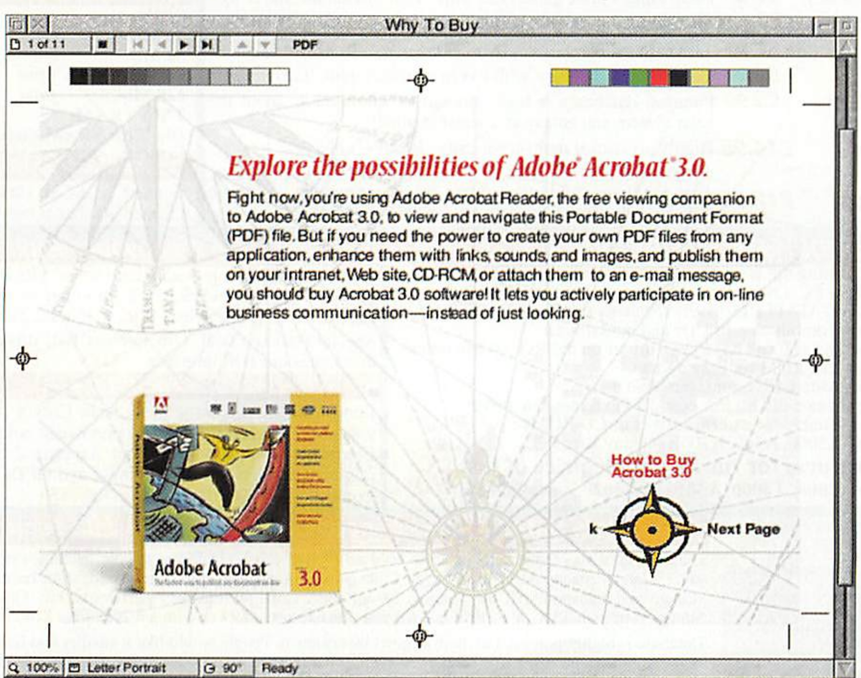
Setting up *RiScript* is fairly straightforward, is well documented and won't take most users more than about three minutes in all. Basically, a PostScript printer definition file must be installed and then set to print its output to a file somewhere on your hard drive rather than to a printer. Think of it as a virtual printer which *RiScript* then handles the output of, if you will.

This step is not absolutely necessary though; PostScript and PDF files from other sources may be viewed and exported without the use of the PS printer driver in RISC OS. The setting up of a printer driver is only necessary if you're wanting to produce PDF files from RISC OS applications.

To produce a PDF from a RISC OS document, the desired file is printed via this installed PostScript printer and the output dragged to *RiScript* for display and subsequent conversion. It would be nice to see the app take care of the whole process from the clicking of the Print button onwards of its own accord and Cerilica are looking into it. However, as it stands, things aren't too bad and the PostScript is promptly displayed on screen ready for output.

Generally, *RiScript's* output is identical to the original, be it an Impression document or even a scanned page of text and pictures. Font handling is, for the most part, very well implemented. Since not all systems can be assumed to have the same fonts installed, mappings may be set up to instruct *RiScript* to substitute PC/Mac font names when producing PDFs. PDF and PostScript files can contain embedded fonts though and, if this is the case, *RiScript* will automatically convert Type 1 and 2 fonts to the RISC OS outline font format for anti-aliased rendering.

Some fonts found on the Acorn, especially decorative ones, don't have a PC equivalent. If this is the case, it is best to convert text to paths (vector outlines) in something like *Draw/ArtWorks* prior to passing the output to *RiScript*. The program itself can also be configured to do this automatically for Type 3 fonts



Rendering a PDF with RiScript

of the Ri



An Impression Publisher document output using the standard PS2 RISC OS printer drive then dropped into RiScript to allow the saving out as a drawfile

embedded in PDF or PostScript files. However, no support exists for TrueType fonts so these must always be mapped to RISC OS fonts.

The main problem with *RiScript* is its lack of support for image clipping. For example, if you output a document from Impression where an image has been cropped by reducing the surrounding frame size, the lack of clipping in the PDF file will mean that the image in question will be displayed at its full size and obscure surrounding text. This issue is not the fault of Impression or *RiScript* but rather the DrawFile format. Cerilica are currently looking at using technology from *Vantage*, the company's upcoming vector package to work around this issue. Once *Vantage* is released, an upgrade may be offered for *RiScript* users.

Documentation on manually avoiding the clipping issue is included on the support disc. The workaround means cropping images to the desired dimensions prior to using them but this is obviously no help when using irregular frames.

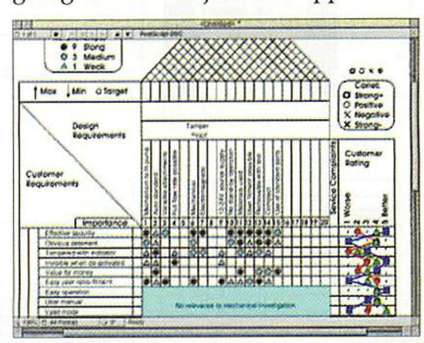
Output PDF files are generated fairly quickly on a StrongARM machine but, as you would expect, things are a little slower on lesser hardware. That's not to say its unusable, just a little slower when rendering and outputting.

RiScript can also be used to display PDF files from other machines, be they RISC OS or otherwise. Its performance in this respect is very good. However, it could be better and Cerilica are currently looking into some problems highlighted by the testing towards this review. The main display glitches tend to be the clipping problems as well as the odd missing image.

A very large number of Web sites now use the PDF format to distribute documentation which has been scanned in from paper sources. The US Patent department and also OFSTED in the UK are two prime examples.

CD-ROM based user manuals are often given out in PDF format in the PC hardware and software scenes. This might be an interesting thing to do for some RISC OS applications. However, one major flaw in *RiScript*'s production of PDF files is that there's no support for linking to other pages within the document. This is essential for any sort of online documentation so it's a pity it can't be done from RISC OS. However, internal links are supported in PDFs given to *RiScript* as is jumping to specific pages within long documents which is a good thing. PDFs from other platforms may be printed from *RiScript* and also exported as Draw files.

It would not be fair to review *RiScript* without talking a little more about its PostScript handling capabilities. For anyone who regularly has to get work printed via another computer or print bureau, *RiScript* will come as a godsend. Prior to transmission to whoever will be printing it, the file can be quickly double-clicked on to make sure it's going to turn out just as it appeared



An alien file successfully converted to a Drawfile using just RiScript. As with PDF files, fonts are converted into universally-usable RISC OS equivalents. Vector graphics are editable using all drawfile-compatible applications. Text may also be editable, depending on the format.

in *Impression*, *Ovation Pro* or whatever.

For professional publishing work the ability to create and output PDFs – and be able to view them first to ensure they are right – is essential. More and more printers are now able to print direct from PDFs (there is no "film negative" stage at all any more, the printing plates are created directly from the files) and the savings are considerable. From the December 1999 issue *Acorn User* itself has been completely electronic until it reaches the printing presses – and it is sent in PDF form.

And the advantages aren't just financial, as there are fewer hardcopy stages it means that the final print quality is better too. It means that you can have your cake and eat it.

But this works both ways: Not only can the RISC OS platform create files that can be used on other platforms without difficulty, it also means that RISC OS machines can be used to create publications using files from elsewhere.

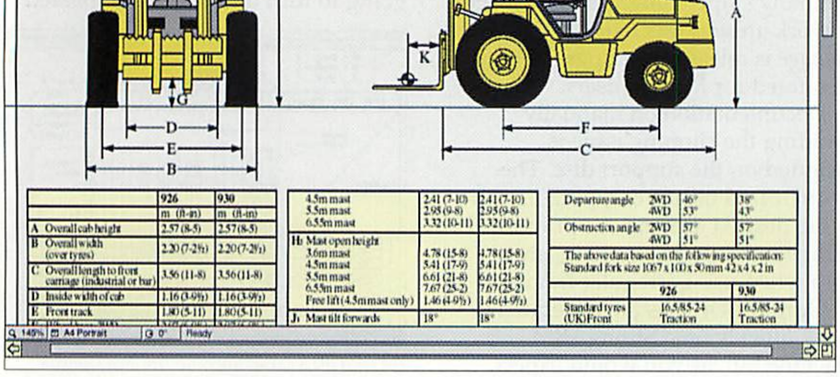
More than that, with PDFs now being the preferred method of information transfer, since what you see is what you get – regardless of the platform (within limits) – the ability to create and view PDFs effectively gives RISC OS users another edge. The ability to output as drawfile gives us yet another advantage – since drawfiles are universally accepted by RISC OS products (word processors, DTP packages, presentation software, bit-map and vector graphics editors) we can take the output of other software, from RISC OS or elsewhere, and then import and edit. As the format is a vector graphics file it can be edited properly (no wiping out of backgrounds and re-painting) and then used or re-exported.



The only potential difficulty here is that with fully justified text (for example) every letter is positioned separately and won't produce continuous, editable text – although *RiScript* has an option to restore the text, at the expense of layout accuracy.

PostScript isn't just a file format, it also forms a comprehensive programming language which may be used to describe the layout of pages. For those who wish to use the feature, a second program by the name of *ScripTerm* is provided which provides a command line interface for *RiScript*.

To conclude, if you're just looking for something to view PDF files and have no need to generate them yourself, *RiScript's* £59 price tag is a little steep. But that's not what *RiScript* is for: It's a very complete PostScript interpreter which means you can import EPS, PS and PDF files and then view or export as PDF or drawfiles. **END**



© JCB

This PDF file has a combination of vector graphics, bitmap images and text using an included font which was automatically interpreted by RiScript into a RISC OS-style font and then used to display the image. Full font blending was turned on to ensure anti-aliasing looked correct on different colour backgrounds in the information boxes.

Product details

Product:	RiScript
Price:	£59
Supplier:	Cerilica Ltd. PO Box 40, Ross-on-Wye. HR9 7WH
Tel:	01989 567 350
E-mail:	cerilica@cerilica.com
Web:	http://www.cerilica.com/

Back to the scr

One of the features of *Ovation Pro* that gets passed over by many people is its scripting language. Scripting is a feature common to many serious applications on other platforms, and several RISC OS ones too. Essentially, scripts provide a way either to automate jobs that you do often (insert a common phrase, for example, or reformat and print your document) or to extend the functionality of the application itself. *OvPro*'s script language allows both of these things to be done.

Last year, *Acorn User* carried a series of articles in which I introduced the use of macros in *OvPro*. The short scripts suffer from several drawbacks: because they are short (a maximum of 256 characters long) they cannot be very complicated; and you cannot easily define and use windows, buttons or external files in macros.

However, *OvPro* allows another use of its scripting language, to create small, external applications. These so-called 'applets' are easy to create and, once you know the basics, can be very powerful. There are several applets that I would find it very hard to live without, and even *OvPro*'s very own Colour Supplement (which used to be sold as an optional extra) is actually an applet.

This article and two more in forthcoming issues will show you how to write an applet for *OvPro*. This month, I will be going through a minimal applet that I've called *Pointless*, because it doesn't actually do anything. However, it should give you a good idea of how to start. In the next two articles, I will build a more useful applet on these foundations, covering some of the structures that applets can use.

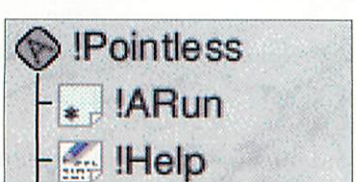


Figure I: The structure of an applet

I won't be talking a lot about the script language itself, either its syntax or specific commands. This is partly because that would be repeating the last set of articles but also because its syntax is very similar to C, any decent C book would give you a good idea of how it works. The commands themselves are documented (briefly) in the manual and in the supplementary files that come with the updates. Read these extra files because the script language is being updated rapidly, as is the rest of the application, and many of the new commands are very useful.

Essential bits

An applet is built like a normal RISC OS application. This means that it consists of a directory whose name starts with a pling (!) and contains certain files. Figure I shows the structure of a basic *OvPro* applet, with the essential files and directories.

All applets must have a *!Run* file, which is executed when the applet's directory icon is double-clicked. This is a standard file that you can steal from an existing applet. It's job is to put a hyphen on the end of the applet's name or remove it if there already is one. This turns the applet on or off – *OvPro* loads all of the applets in its *Applets* directory when it starts up, except those whose name ends with '-'.

The other files are as follows:

!Help which provides the usual help function. For applets, this usually gives a brief description of the applet and installation instructions. Again, the instructions can be stolen from another

John Pettigrew makes Ovation Pro even better

ipt

applet, because they will be the same.

!Info which tells *OvPro* about the applet, including its version number and the author. The tricky bit is that it also specifies which version of *OvPro* is needed to run the applet. This will probably be because the applet uses commands that were introduced in that version. It's important to get this right but, if you're in doubt, you can just set it to the version of *OvPro* that you're running – you know that your version runs it, so later versions should but earlier versions might not.

!ARun which does the things that you would expect the normal *!Run* file of an application to do (it's 'A !Run' file). It has to be present even if there's nothing in it. If you don't know what a *!Run* file does, don't worry, you can almost certainly leave it empty, like *Pointless*'s.

AResources this directory should contain at least the Messages file. This is a text file with a series of (one or more) 'messages', which are little text phrases that you can use from within the applet (Figure II). The format is that each line contains a 'token', which is usually the applet's name followed by a number. After this comes a colon and the text you want attached to that token.

The *AResources* directory can also contain sprite, template or other resource files that you need. These will be loaded when *OvPro* loads the applet as it starts up. *Library* this directory contains the script file itself. If your applet has several script files, they would all live in here. It is usual to name the script file after the applet but this isn't obligatory.

```
// Pointless v1.00
//
// A demonstration OvationPro applet
// Doesn't actually do anything useful but contains all the essential files
//
// @John Pettigrew


// Initialize and add an entry for this applet to the applet menu

void main(void)
{
  script_menu_initialise();
  addentry_menu(script_handle,"","","","","{POINTLESS_00}");
}
```

Figure III: The absolute minimum script

In the script

The piece of the applet that takes any effort to create is the script file that lives in the Library folder. This is executed when *OvPro* starts up, to register the applet with *OvPro* and create any menu entries or similar that you want. This is very easy to do.

Figure III shows the absolute minimum that an applet must normally do when it starts. The green text is commented out – it's for the benefit of human readers, not the computer. An applet script must contain the main function, which is the one that is run on startup. The "void" before "main" means that this function will not return any values to *OvPro*; the second means that it won't pay attention to any information that OvPro passes to it.

To register the applet with *OvPro*, you simply use the *script_menu_initialise();* command. The other command in this minimal applet script creates a new entry in the Applets menu. The *addentry_menu* function can be passed several variables. The ones used here are *script_handle*, which is a number generated automatically by *OvPro* that uniquely identifies your applet.

The last parameter is a token that is translated from the Messages file in your *AResources* directory. The first token is usually attached to the script name for the Applets menu, as here. So, if you put this applet into your Applets folder, you would find a new entry on the Applets menu that read *Pointless*. As you can see, it

```
// Pointless v1.01
//
// A demonstration OvationPro applet
// Doesn't actually do anything useful but contains all the essential files
//
// @John Pettigrew

int pointless_status = 0;

// Run when the 'Pointless' entry in the Applets menu is selected

void pointless_entry(int entry, int subcode)
{
  string s = "{POINTLESS_01}";
  translate(s);
  type (s);
  pointless_status = !pointless_status;
}

// Tick or untick the 'Pointless' menu entry

int pointless_tick(int entry, string &text)
{
  return(pointless_status);
}

// Initialize and add an entry for this applet to the applet menu

void main(void)
{
  script_menu_initialise();
  addentry_menu(script_handle,"pointless_entry","pointless_tick","","","{POINTLESS_00}");
}
```

Figure II: Text resources

```
// Pointless v1.01
//
// A demonstration OvationPro applet
// Doesn't actually do anything useful but contains all the essential files
//
// ©John Pettigrew

int pointless_status = 0;

// Run when the 'Pointless' entry in the Applets menu is selected

int pointless_entry(int entry, int subcode)
{
  string s = "{POINTLESS_01}";
  translate(s);
  type (s);
  pointless_status = !pointless_status;
  return(0);
}

// Tick or untick the 'Pointless' menu entry

int pointless_tick(int entry, string &text)
{
  return(pointless_status);
}

// Initialize and add an entry for this applet to the applet menu

void main(void)
{
  script_menu_initialise();
  addentry_menu(script_handle,"pointless_entry","pointless_tick","","","{POINTLESS_00}");
}
```

Figure IV: Getting the script to do something

takes almost no effort to get to this stage. The rest of the job is simply responding to events within *OvPro*. You can ask for your applet to be notified whenever various things happen, including windows opening or closing, files being opened or closed, the cursor moving and so on.

A full list is given in the *OvPro* documentation. However, this applet won't do any of this yet because we've not told *OvPro* that we're interested in any events and haven't written any functions to deal with the events.

User interaction

Figure VI shows the listing of a longer version of the *Pointless* applet. This version will tick and untick its entry on the Applets menu when that entry is clicked on and insert text at the cursor. The main function must always be at the end of the script file. This is because scripts can only call functions or use variables that have already been defined. This means that you have to write the script 'back to front'.

To start with the main function, the only changes that I've made here are to add two more variables to the *addentry_menu* call. If either of these variables is not present, nothing will happen. The first variable passed to *addentry_menu* tells *OvPro* the name of the function to run when the menu entry is clicked on. The second passes the name of the function to run when the Applets menu is opened. This function will set the flags for the menu entry we've defined; I'll explain below how this works. The last two parameters, which aren't used in this case, contain the name of a function that will define a submenu (if blank, there will be no submenu) and any key shortcut that you want for this applet's function (if blank, there will be no shortcut).

Bits and pieces

In addition to the main function (Figure IV), there are three things going on in this script. The first is that I've defined a variable, *pointless_status*. This is a global variable (that is, it will be available in all functions and won't be discarded when a function ends) and so has to be defined right at the start of the program. This variable is used to store the current state of the menu entry (its flags).

The *pointless_tick* function is extremely simple. This is the function called when the applets menu opens and simply returns the value held in *pointless_status*. As it starts off with a value of 0, the menu entry will be normal (not ticked or underlined or shaded) initially. The function itself is passed two parameters by *OvPro*. These are the number of the menu entry that was selected (usually unimportant) and the text in that entry (useful if it's set to be a writable value). However, we don't need to do anything with these in this example. The remaining function does two things: First, it inserts text at the cursor; second, it ticks and unticks the Applet menu entry. Taking first things first, the three lines at the beginning of this function control the text insertion. You could simply use:

```
type("Hello!")
```

but here I've shown another use for the Messages file. Using tokens means that you can use the same piece of text in different places in the applet without typing it in each time. Also, if you subsequently want to change that text, you only have to alter it in the Messages file, not every time it's used in the applet.

What these lines do is to define a string variable and set it to contain a token, {POINTLESS_01}. This is then passed to the translate command, which changes the value of the variable from the token to the text that it points to. This variable is typed at the cursor. Simple.

Now, we need to change the value of the menu entry flags. Because we're only interested in ticking and unticking the menu entry when it is clicked on, we can do this simply with a NOT operator. In C and *OvPro* scripts, this is done by placing a '!' before the variable so, here, I've set the variable *pointless_status* to NOT *pointless_status*. This variable starts off as 0; 'NOT 0' is defined as '1' and 'NOT 1' is '0'.

The flags can also contain other values than 1 and 0. This number can be looked at two ways – as a four-digit binary number (such as 1001) or as a decimal number between 0 and 15. Each of the bits in the binary number represents a certain attribute of the menu entry. Bit 1 controls the ticked status (as above); bit 2 controls rule offs, bit 3 writability and bit 4 shadedness. It is probably easier, though, to think of the number as adding 1 if you want it ticked, 2 for ruled off, 4 for writable and 8 for shaded. Thus, 3 would mean ticked with a line under the entry; 9 would mean ticked and shaded.

Moving on

That's all for this month. This applet is pretty much pointless – inserting text could be done very simply indeed with a short macro – but shows some of the essential points of applet design. The applet itself is on the Web site and will be on the next cover CD, so you can look over the full listing at your leisure.

Next month, I'll be starting to go through a more worthwhile applet. This will provide a palette that will allow easier control of certain text attributes, in a similar manner to the style, colour and page palettes. This will cover sprite files, templates and more useful events. END

Reading the leaves

Steve Turnbull looks into the future of RISC OS

Once upon a time a small British computer manufacturer had a machine that they advertised with the slogan "the fastest personal computer in the world" – and were challenged by much bigger companies on this claim. But they won and were allowed to continue calling it that for quite some time. The computer in question was the 8MHz ARM2-based Acorn Archimedes A310 and the year was 1988.

The established claim was based on superior hardware, a 32-bit processor plus a compact and efficient operating system. Time passed and, arguably, Acorn lost its way and decided it could never win in the desktop computer market. Thus development slipped and the machines lost ground.

It was true that elements of the operating system, most notably the Font Manager and ARMovie, were vastly superior to anything available when they were first released, and even now the Font Manager has few rivals. But Acorn chose to make decisions which led first to the abandonment of several years of desktop development and from there to the final break up of the company just over a year ago. It seems much longer.

One suspects that the individuals that ruled Acorn at that time believed that cutting off the unwanted appendage that was the desktop machine market would result in it simply withering and dying. The fact is that, in their arrogance, they failed to recognise that the Acorn desktop market was far more than a few programmers and hardware engineers inside their own offices and a few die-hard loonies outside – though if they had only looked at the Amiga market they would have seen what was to come.

The RISC OS market

In any dedicated group of people the whole is greater than the sum of the parts, we may all be individuals but the group itself has a life of its own, it has its own purpose (its own survival first and foremost) and it's not easy to kill. The thing that binds a group together is communication – whether it's the Internet, the developers, the dealers, *Acorn User* or the local user groups. We all work together supporting each other and ensuring the dream is forwarded.

Naturally many people chose to leave the market when Acorn left and in the months of turmoil that followed, they were the ones who did not have the same dedication and enthusiasm – belief in the machine. Yet that, in its own way, makes the group purpose even stronger.

These are hard times. Most of us are working with machines that are over five years old – and even older in terms of design. Dealers must diversify into other areas in order to keep the RISC OS side satisfied and functioning while some choose to make what they see as the "sensible business decision" – even though they don't want to – and switch completely, no longer supporting RISC OS at all.

The formation of RISCOS Ltd was a fundamental requirement to future success, if there's is no advancement there can only be stagnation and eventual decay. Likewise the new machine manufacturers – Castle, Microdigital, Millipede and RiscStation – balance RISCOS Ltd's software development with hardware to use the new facilities. So the lost ground can be made up in terms of development.

Then there are the developers, those who are actively producing new software and newer versions of existing software: Spacetech, Cerilica,

R-Comp, Castle, Clares, David Pilling, ANT and many others. They continue to put resources into the market, taking the long term view – believing there are still opportunities.

The market itself is like a living entity, it has its purpose and its communication lines, and cutting those lines would be the surest way to kill it. But that would be very hard indeed, *Acorn User* is going from strength to strength, the Internet is an uncontrolled anarchy that cannot be stopped and what dictatorial police state would stop Acorn User groups? Except, maybe, one controlled by Microsoft?

This is the straight line of purpose: Develop newer and better versions of RISC OS; build new machines that use RISC OS; create and improve software that uses the faster speeds and better resources of these machines. But there are other directions that could be taken.

- We could give up completely: As a whole we just stop, cease and desist – though Acorn have already proved that that is impossible; the market is an entity in itself, and one composed of such dedicated individuals you cannot just stop it dead;
- Divert: Linux seems a pleasant way to go, it's a roaring flood of anarchic development and individuality – with something like Thomas Leonard's ROX window manager you can have something that looks like RISC OS. But it requires that the market becomes a bunch of hackers – a lot are, but most are not;
- Fail to expand: That's a sure route to a lingering death, companies slowly collapsing and disappearing; while the individuals argue endlessly as to why it's all going wrong, blaming everyone but taking no responsibility themselves;

Or, we do something about it.

Preaching to the converted

I assume that, since you are reading this, you consider that RISC OS machines have value. I could bolster your opinion, I could tell you how right you are – after all I agree with you. But what value does that have?

What's the point of me telling you something that you know already? Why should I waste my time preaching to the converted?

No reason. It has no value whatsoever and I'm not going to because there is so much about RISC OS that could be better. Not just the operating system but the market as a whole.

What lesson has been learnt in the past 13 years of ARM-based RISC OS machines? Could it be that the march of Microsoft cannot be stopped? British technology never succeeds, it's either stolen, sold out or buried? RISC OS is just a minor thing that will disappear with time, inevitably? Most people are too stupid to recognise that RISC OS is self-evidently better no matter how many times you tell them?

None of these things are necessarily true: the march of Microsoft is already being hit by GNU/Linux; RISC OS isn't dead yet (nor has it been stolen or sold-out, quite the contrary); and people can recognise a better product, but not if you tell them they're wrong.

Keep your head down

There is a war going on but it's not always recognised as such. At present the war is between Microsoft and GNU/Linux and it's a public relations war.

With Intel and Microsoft spending more on PR than the GNP of many small nations it's hard to see how anyone can fight back. Yet PR is the least costly form of combat and it's a fight in which anyone can take up arms for their favourite cause.

There are people in the world who believe completely that Bill Gates was a computer programmer and his recent announcement about withdrawing from directing Microsoft to return to development was a kind and beneficent thing. The great father of modern computers wants to ensure that future products are created properly.

Just PR which gets a bad name when people use it to perpetuate lies, but it doesn't have to be a bad thing.

The fact is the Microsoft PR machine knows what it is doing. With a good, solid foundation of PR and people thinking kindly about you and your products they will be far more susceptible to your marketing campaigns and will buy your products.

And what PR activities do the organisations in the RISC OS market do? Virtually none. And *Acorn User* has been as guilty as the rest but we're changing that.

Playing the PR game

The fact is that a large proportion of the population believe what the Media tell them – and even those that don't still listen to the Media cannot help but be affected.

They read their newspapers, watch or listen to the news and the magazine programmes, the Media has the power to communicate the PR message and they do, the Microsoft PR machine spends a fortune getting pro-Microsoft news items into the various programmes to ensure that people think of Microsoft in a good light.

Don't make the mistake of thinking that just because *you* don't

Do you want to help?

There are a number of steps to follow to get to the stage where the Media is being bombarded with press releases, and one of those steps is getting a database together of contacts to send out to.

All you have to do is note down the names and contact details of any journalist you know of who deals with technology or education issues for national newspapers, plus contacts for your local newspapers.

Naturally we will get duplication but don't let that stop you, I'd rather have the same name a dozen times than miss one. Send it in to the magazine either by post to: PR Media Contacts, Acorn User, Tau Press, 26 Stockport Village, Hooper Street, Stockport SK1 1DQ, or e-mail to: pr@acornuser.com

As the database develops it will be distributed to all RISC OS dealers and developers who will then be able to send out their press releases and news stories on a regular basis.

like Microsoft, and everyone you talk to doesn't like them, that people (at large) don't. Most people just accept what they're told, they have nothing to compare with so it just gets absorbed in an unconsidered way.

The recent news story about the girl in the school with the "bodyguard" is typical. It makes a great story with lots of controversy, personal harm and so on. Yet a teacher hearing the story went: "That doesn't sound right, that's not what really happened" and sure enough as more details were revealed the truth was nothing like the initial story.

It takes someone who understands the subject in the first place to be able to pass a valid judgement. But you cannot educate the general population on the ins and outs of computing so that they can make a valid judgement. You can, however, use PR.

And it's no longer as difficult as it used to be, perhaps three years ago it would have been very very difficult to make anti-Microsoft PR actually stick. But the rise of GNU/Linux plus the inevitable attacks that any successful individual or company receives (the Press hate anyone who is hugely successful) mean that it is easier to get anti-Microsoft PR noticed. You might wonder why I keep harping on the "anti-Microsoft" line, it has to do with the content of press releases and pushing the pro-RISC OS line. Journalists and news editors love nastiness about famous things, they feel that's what sells newspapers and magazines (whether it's true or not is another question altogether – and not relevant here). So you give it to them, give them all the unpleasant and nasty stories of how the evils of Microsoft have caused untold harm, and how RISC OS came to the rescue – or could have if it had been given a chance.

And that's how we can win.

It requires a constant pressure of press releases forcing pro-RISC OS PR riding on the back of anti-Microsoft PR. And out of this constant flood we would get, a little story here, a story there.

Then you would be able to start putting a scrapbook together of news cuttings "The Times says this about Microsoft in schools...", "The Guardian revealed how this company was taking back-handers to put software products into businesses...", "The Independent reports how RISC OS businesses are not crippled by system support costs unlike companies using..." and so on.

Then when someone comes along saying "We need to put in Microsoft products" there is a background of anti-Microsoft and pro-RISC OS feeling along with the "proof" that RISC OS is the better option. After all the machine is perfect for schools – they use it on *Who wants to be a Millionaire* don't they?

Cynicism rules

I may be accused of being cynical, after all everything I say here applies to any computer, someone who uses the Amiga could say "hey guys let's get together and really start pounding the Media with press releases about how the great Amiga saves people from the horrors of Microsoft!"

And that is true, the rules apply equally to everyone, luckily we can be righteous. The right *is* on our side. RISC OS isn't perfect, not by a long way, but it's a hell of a lot better than the major alternative: the operating itself *is* being developed, hardware *is* being built and professional software *is* being written. This is not a dead market by any stretch of the imagination – it's just a small one.

However, by effective use of PR, it can be made to look like a really huge and effective market. The journalists and news editors believe what they are told, and if they are told enough times that good and decent RISC OS will save the world from the evil Microsoft, they *will* believe it. And that's what they will pass on to their public, who will then become our public.

The best problem

We have an opportunity to turn everything around, the rot has been stopped and the market is no longer shrinking. It cannot expand unless a concerted effort is taken to really push it into the limelight.

The result of a successful push will be people queuing at the doors of Castle, Microdigital, Millipede, RiscStation and the dealers demanding machines. Too many customers is a problem we'd all love to have, we just have to make it happen. END

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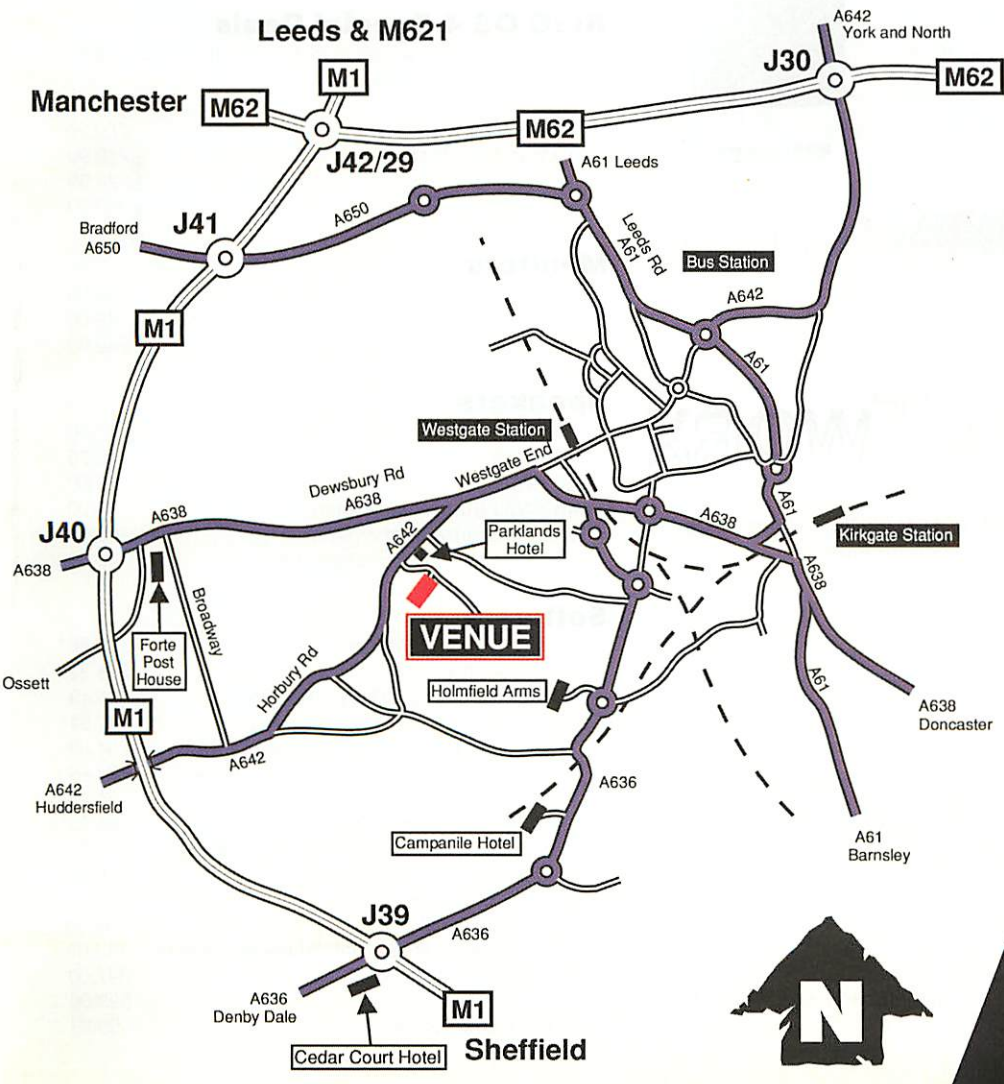
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Linux *User*

Lot of f about

Not so very long ago, in a country not too far away a fellow by the name of Linus Torvalds was born – the country was Finland and the year was 1970. Linus grew up and went to college where he used a PC, containing the "state-of-the-art" processor an Intel 386, and it was running MS DOS – and he didn't like it.

Round about the same time there was a major mainframe operating system called Unix, this was a very serious piece of kit – multi-user, multi-processor – a real heavy weight. A commercial version had been written for desktop computers called Minix – but, of course, it cost real money.

The Internet did exist at this time but was the preserve of scientists, researchers and students, Linus was on it and announced to the world in 1991 that he was developing a free version Minix which had reached the stage where it could be used on 386 machines and various Unix applications would run successfully on it.

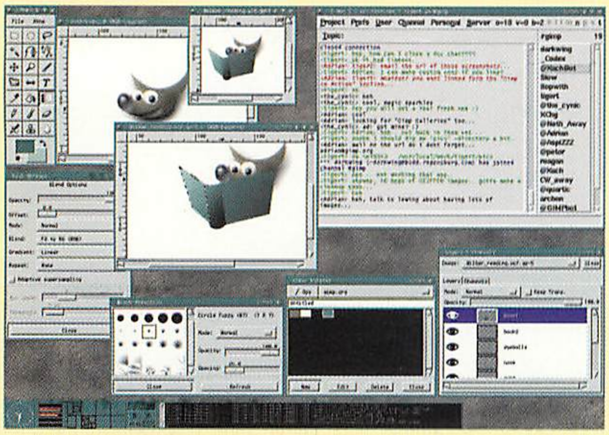
And Linux was born.

There is some difference of opinion on the pronunciation of the word "Linux", some people say Li-nux with a short *i* (as in "ink"). However my personal preference is for Lie-nux with a long *i* (as in the letter name itself), simply because we say Lie-nus not Li-nus – and it's his name after all.

Applications

At first glance most Linux Web sites seem to concentrate on complete distributions – but once you've got your version of Linux what you actually want is something to do with it – you need programs.

One application you're almost certain to get with any distribution is GIMP which is the GNU Image Manipulation Package – a free program that compares rather well with the like of PhotoShop and PhotoDesk.



One problem you may run into if you're not using a PC version of Linux is that you can't get the program you want in a version that runs on your platform. This is where the Open Source comes in very handy, all you have to do is re-compile it for your machine, it's most likely written in C or C++ so you just use the free GNU C/C++ compiler for your machine.

Hopefully, there is one. And if you're not a programmer you might have some problems there because the "just re-compile it" doesn't necessarily work and then you have to get down to the real nitty-gritty and find out why not, fix it and try again.

Games are being converted too but just because a version works on "Linux" doesn't mean it's been compiled for your platform – take care.

What is Linux ex

The simple answer is to say that it's an operating system, but that's not really right. Strictly speaking Linux is only the kernel, the absolute core routines without which nothing else in the operating system will work. All operating systems have them, for PCs it's the BIOS, in RISC OS it's the UtilityModule. Then again, those core routines are nothing without the whole support structure of an operating system around it.

In truth Linus Torvalds came in relatively late to something called the GNU Project. Since 1984 a loose-knit group of programmers had been working to produce a complete, free, Unix-like operating system called GNU, by the time Linux appeared the project was almost finished.

The operating system that people call Linux, is really GNU while Linux, the kernel, takes up about 3 per cent of a complete distribution. Linus Torvalds has celebrity but he was one of many valuable contributors.

At the outset the people involved in the GNU Project

uss something

Make it do something!

So, supposing you've got a distribution installed and running and you're sitting there with a command line prompt in front of you… how do you make it do something?

Very simple. To run an application you simply type its name at the prompt, pretty much like any other operating system (except maybe MacOS which doesn't have a command line as standard).

Any executable code must be stored in a directory specified by the PATH "variable" otherwise it won't be recognised automatically, however you can type in the path name as well to tell the system where to find the program.

The other Unix-like freebie

GNU isn't the only free, Unix-like operating system, there's also BSD developed at UC Berkeley. Though not originally intended to be free the developers, having seen GNU, decided to make BSD free as well and it is also being actively developed.

actly?

made a list of the software that would be needed to fulfil their aim and set about writing it, or getting it written. In the early 90s the GNU project had almost everything complete except the kernel which was to be called GNU Hurd. Writing the kernel was hard – apparently harder than was expected and is still going on.

Linus Torvalds popped up from nowhere with a kernel called Linux which worked and filled the gap so that people could actually put together a completely free, Unix-like system. It took some effort to get the Linux kernel integrated with the GNU Project so that everything functioned properly – it hadn't been written originally to be the missing GNU kernel – and it was the GNU Project who fitted themselves to Linux, perhaps an acknowledgment of an amazing piece of programming.

The GNU Project has been working on its own kernel for many years, Linus Torvalds wrote one in a very short time indeed; perhaps no one told him it was supposed to be hard.

A sense of community

What's it like to be a member of the Linux community? Well anyone who is dedicated to a platform other than Microsoft knows how friendly communities can be – and the Linux one is no exception.

Linux isn't owned by anyone – it's owned by every one, so anyone who uses it, whether a programmer or not is part of the group that's fighting back, successfully, against the supra-national corporates who believe they can tell you how to think.

Anyone can contribute to Linux and its associated software, even if you're not a programmer you can still send your comments and thoughts to the people who create the software and they will listen to you, why shouldn't they?

If they can improve their software through your comments, then they will. What they do may gain them some respect and perhaps a little fame or even notoriety, but they have no other personal gain.

They work cooperatively and that cooperation creates a community spirit that defies any Big Brother corporate while creating superior products, faster. Technically and politically, Linux is the superior choice.



Penguins'r'us

There are three explanations about the Penguin logo for Linux, ranging from true to interesting and, according to the Linux.Com Web site, they go something like this.

Linus Torvalds explains the exact reasoning behind 'Tux', the official Linux mascot, in this crucial message:

"I've always liked penguins, and when I was in Canberra a few years ago we went to the local zoo with Andrew Tridgell (of Samba fame). There they had a ferocious penguin that bit me and infected me with a little-known disease called Penguinitis.

"Penguinitis makes you stay awake at nights just thinking about penguins and feeling great love towards them. So when Linux needed a mascot, the first thing that came into my mind was this picture of the majestic penguin, and the rest is history."

Slightly more accurate version: "Yes, I was bitten by a penguin, but it wasn't actually very ferocious. It was a pigmy penguin about 6 inches tall or something, and it was more of a timid nibble ("is this finger I see before me, a small fish, or what?"). Even so, I like penguins a lot."

More down-to-earth version: "All the other logos were too boring – I wasn't looking for the "Linux Corporate Image", I was looking for something fun and sympathetic to associate with Linux. A slightly fat penguin that sits down after having had a great meal fits the bill perfectly.

"Don't take the penguin too seriously. It's supposed to be kind of goofy and fun, that's the whole point. Linux is supposed to be goofy and fun (it's also the best operating system out there, but it's goofy and fun at the same time!).

"Some people have told me they don't think a fat penguin really embodies the grace of Linux, which just tells me they have never seen a angry penguin charging at them in excess of 100mph. They'd be a lot more careful about what they say if they had."

Window managers

There are dozens of different window managers for Linux, here's some of the more interesting ones:

AfterStep *(www.afterstep.org)*
A window manager for the Unix X Window System. Originally based on the look and feel of the NeXTStep interface.

IceWM *(icewm.sourceforge.net)*
Window manager for the X window system. Designed to be small, fast and lightweight, it emulates the look and feel of Motif, OS/2 and Windows.

Window Maker *(www.windowmaker.org)*
An X11 window manager that tries to emulate the elegant look and feel of the NeXTSTEP(tm) GUI.

Amiwm *(www.lysator.liu.se/~marcus/amiwm.html)*
X window manager that tries to make your display look and feel like an Amiga Workbench screen.

FVWM *(www.fvwm.org)*
ICCCM-compliant, multiple virtual desktop, window manager for X11.

LWM *(users.ch.genedata.com/~enh/lwm/)*
Window manager for X with no icons, no button bars, no icon docks, no root menus, nothing.

MLVWM *(www.2u.biglobe.ne.jp/~y-miyata/mlvwm .html)*
Macintosh-like window manager that looks like the Macintosh Finder.

What is Open Source?

It is a fundamental feature of GNU, Linux and many other free products that they are Open Source. This means that the source code – not just the finished, runnable program – is made available to the user.

And, if you want to, you can change it. The entire source code for GNU/Linux is available for you, personally, to get hold of and look at, change, expand, improve or use as a coffee-cup coaster.

This concept, along with the price of "nothing at all" is terrifying to the big corporates like Microsoft. Imagine this: Out there, on the Internet, is an operating system available to run on virtually any computer platform, that is:

- More reliable
- Free
- Bug-fixed within hours
- Free
- Developed faster
- Free

Because the software developers do not have the weight of corporate paranoia on their backs; as programmers they do not have corporate obscurity, every programmer is face-to-face with the users (virtually); nor do they have any supposed "PR" necessity to deny the existence of bugs but instead feel a need to put it right as fast as possible – after all it's their *personal* reputation at stake; and finally, as the source code is available, if someone else comes along and improves your methods, you can simply accept it and put out a new release – or they will do it themselves. And you have an astonishing result:

Efficient, reliable, bug-fixed software for nothing.



Really ROX

In the weeks following Acorn's cancellation of Phoebe the Internet newsgroups saw all manner of schemes to save the system discussed. Still, it seemed that most of these rescue plans involved a great deal of effort simply to get back to where we were before; expensive computers with a shrinking user-base.

Now most Acorn owners use other systems too and, like many others, I was quite into Linux by this time. Linux has all the features that RISC OS is missing: preemptive multitasking, memory protection, virtual memory, caching, hardware independence and so on; what it lacked was a decent user interface.

After considering which features of RISC OS were important to the interface, we concluded that the Filer, drag-and-drop loading and saving, application directories and image filing systems were the most important aspects.

Several groups announced plans to develop a system that combined a Linux kernel with RISC OS user-interface features but after several months no progress seemed to have been made. So I decided to write ROX: RISC OS on X (the X Window System is the main graphical display system used on Linux and Unix). I started writing the Filer in February last year along with an iconbar and a text editor.

It quickly became apparent that the iconbar was all but useless, most of the programs run under ROX are not going to be ROX applications and so do not use the iconbar. This lead to a highly inconsistent GUI with most applications opening a window as soon as they were loaded instead of installing on the iconbar. I scrapped the idea and replaced it with a modified Filer window. The effect is the same: when you click on Edit an editor window appears but the advantage is that it works equally well with non-ROX applications.

ROX does not aim to look and act exactly like RISC OS, it aims to combine the best features of RISC OS with those of Linux. For example, Filer windows look quite like RISC OS ones but they have a number of extra

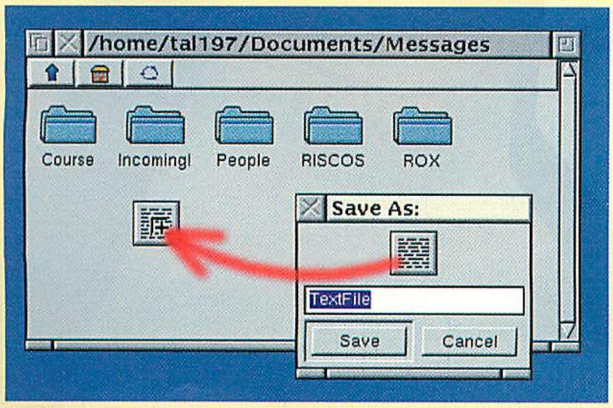


Figure II: Saving a file from an Edit window (not shown). Looks familiar?

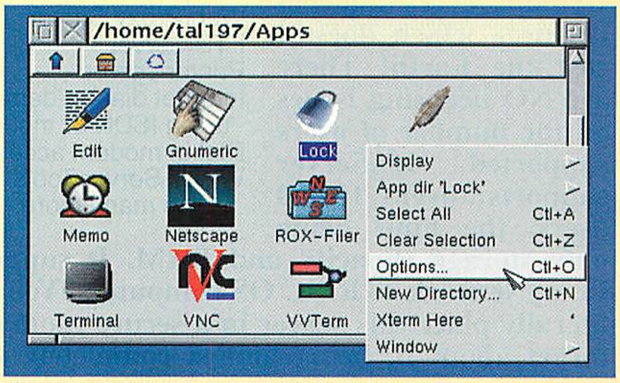


Figure III: The Filer looks very like the RISC OS one, but there are a few extra features, usually configurable from the Options window...

features such as keyboard shortcuts for all operations and the ability to search for a file in a large directory (Linux has no files-per-directory limit so this is quite an important feature).

Another goal of ROX is to add RISC OS features to existing Unix applications. The first step of this was support for drag-and-drop saving, which several non-ROX applications now support. Most applications use a toolkit to do deal with saving, and once these toolkits support drag-and-drop saving all the applications which use them can too.

Image filing systems allow you to open a file as a directory. It's what allows you to open an ArcFS archive and run programs from it directly under RISC OS.

Linux already has the low-level support for this, you can take an image of a CD, for example, and then make it appear as a directory but as far as I know no-one has thought to extend this ability to archives, images, videos and so on the way RISC OS does. This is next on our list once the Filer is finished.

Because ROX integrates well with other applications the Filer is now being used by quite a number of people who have never used RISC OS before – this is excellent news all round as the Filer has picked up some useful tricks from elsewhere: such as keyboard navigation and the (optional) single-click operation mode.

Another advantage of integrating well with non-ROX applications is that it allows developers to create ROX applications safe in the knowledge that they can also sell to the huge number of Linux and Unix users without modifications to their code.

ROX is being developed under the GPL – the same license as Linux itself – which means that anyone can use it for free, see how it works and contribute code to the project. You can get more information about ROX, download the latest version or subscribe to the mailing list at the ROX web-site:

http://www.ecs.soton.ac.uk/~tal197/rox.php3

R-Comp monthly

Alasdair Bailey gives his regular report

After missing an issue due to the lack of any notable goings on in the gaming world, GameShow is now back for good. One phone call to Andrew Rawnsley of R-Comp has given me lots of developments to pass on to you along with many reams of top secret info, only known by the gaming *Elite* of the platform.

First off, R-Comp's port of *Quake* is to be made RiscStation-friendly. The planned re-compilation of the sources with floating point code left in for the machine's ARM7500FE processor will also be of interest to A7000+ users. What level of performance can be achieved by this is yet to be seen but hopefully, the RiscStation will be able to compete with a Risc PC's still somewhat sluggish *Quake* performance. A7000+ users on the other hand, may still find things a little on the slow side.

A bug fix for the release version of *Quake* has also been released and distributed to all existing users. If you haven't received an upgrade, contact R-Comp at the address in their advert. The bug meant that on occasions, use of the electrogun in *Malice* would crash the machine completely. The current version, v1.09, remedies this along with a couple of other misfeatures (I *like* that word).



Window bashing, great fun!

Avid gamers will have seen that the source code to *Descent II* was released in the dying days of '99. Sir Rawnsley commented that R-Comp are indeed looking into producing a RISC OS player for this game because it's not too dissimilar to the original *Descent* which is currently available for our platform for the sum of £30.

Before I leave the R-Comp vein, a quick word of warning. Owen Griffin kindly e-mailed me this week to point out that the cheats for *Heroes of Might and Magic II* which we printed in the February issue mess up the high-score table. So, if you do want to use them, make a back up copy of your *!Heroes2.HighScores* directory first. You might think that a person such as Owen would be on the straight and narrow but he also contributes another cheat. Apparently, typing 8675309 during the game will reveal the whole map. I don't like to sound like an over-zealous primary school teacher but don't use this one too soon in the game because it will make things intolerably slow on anything less than a StrongARM.



Quake – now with working Electro Gun

GEK it right

As recently reported on these pages, continental coding group, GEK, have left the scene. However, VOTI have stepped into the void and are now "acting to facilitate the continued development of former GEK products and services" according to frontman, Nathan Walker. All of GEK's freeware games are now available for download on the VOTI website (see URL below) along with two recent titles, *SpeeC* and *NoWindows*. Both titles were still under development at the time of GEK's departure but are still fairly playable. *NoWindows*, especially, is a good laugh if that *FlyingWindows* screensaver on the PC gets on your wick.

Walker also commented that the group is short of graphic artists so if you feel you have what it takes, pop along to http://www.stormloader.com/wrath/index2.htm and drop them a line.

RISCOS Un-Limited

Ever since the conception of the Phoebe, 3D graphics cards have been a hotly debated topic in both gaming newsgroups and the market as a whole.

These cards, traditionally used in PCs, take care of many graphical functions, leaving the main processor free to run the game engine. Modern cards not only hold

all the VRAM necessary to feed the screen but also include their own on-board processors to perform tasks such as z-buffering and tri-linear filtering to improve the appearance and smoothness of games.

Until recently, most 3D accelerators plugged into a PCI expansion slot inside a PC. However, their data throughput rates became so high that the AGP standard was devised in order to speed things up. News that the RiscStation *Evolution* is to include PCI slots has once again opened the floodgates to wild speculation, lies, damned lies and video tape.

Now it's time for a bit of rumour quashing. First off, neither the Mico nor the Imago are to include PCI (or AGP) slots so they're out of the equation. Okay, so it would be possible to mount chipsets on Acorn podule cards but that would make the price rocket and speed would still be an issue.

This leaves us with the RiscStation *Evolution* being the only viable alternative. If things work out just right, the machine, which will feature high-speed PCI slots should be on the market before the end of this year.

It's no secret that Simtec/RiscStation originally had difficulty with PCI. The *Lite* and *NetWORX* machines were rescheduled because of the difficulty in getting the PCI work ready in time for their shipping dates. However, the next generation RiscStation, the *Evolution* will feature full PCI support.

It is rumoured that drivers already exist for a popular off the shelf brand of PCI graphics card. If these drivers do indeed exist, they would no doubt have been written for the development version of the Phoebe. RiscStation's PCI interface would be implemented in a slightly different way to that on the Phoebe so some modification would probably be needed to the drivers.



HoMM2 map editor

Understandably, obtaining drivers for 3D cards is not exactly at the top of RiscStation Ltd's list of priorities at the moment. However, the company do keep on making positive sounds on the subject with representatives of the company often being seen talking to game authors at shows.

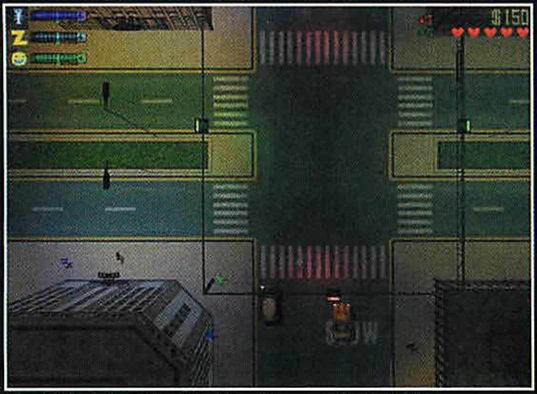
Without wanting to dampen hopes too much, it is worth pointing out that the popular opinion seems to be that an ARM7500FE processor as used in the RiscStation would be a little on the slow side anyway. We'll most likely have to wait for StrongARM based PCI solutions before 3D cards can fully be taken advantage of in RISC OS games.

Anyway, we'll keep you posted and, like I say, RiscStation are making some interesting noises on the gaming front.

Be a Hero!

This is your chance to become the champion of the RISC OS gaming community by designing the best ever *Heroes of Might and Magic II* map. One lucky person stands a chance of winning an R-Comp voucher worth a full £20 off any of their titles.

Heroes of Might and Magic II is a turn-based strategy game which was converted from the PC to RISC OS in late '98. The *Price of Loyalty* expansion pack was recently released and was reviewed in our February edition. If you still don't have the original game, it's well worth the £35 if you ask us so don't delay in buying a copy.



Grand Theft Auto 2 on the PC, a fine example of what's possible using hardware graphics/3D acceleration

Both the expansion pack and the original game include a map editor. It's so easy to use, we needn't even give you a tutorial but the editor is covered in the game's own manual if you do get stuck.

Submitted levels may include any of the features offered in the map editor with extra credit being given for ingenuity story lines and good use of the available artifacts and resources. Maps which make the judges laugh will also be smiled upon, as would themed entries (*Quest for the Holy Grail*, anyone?).

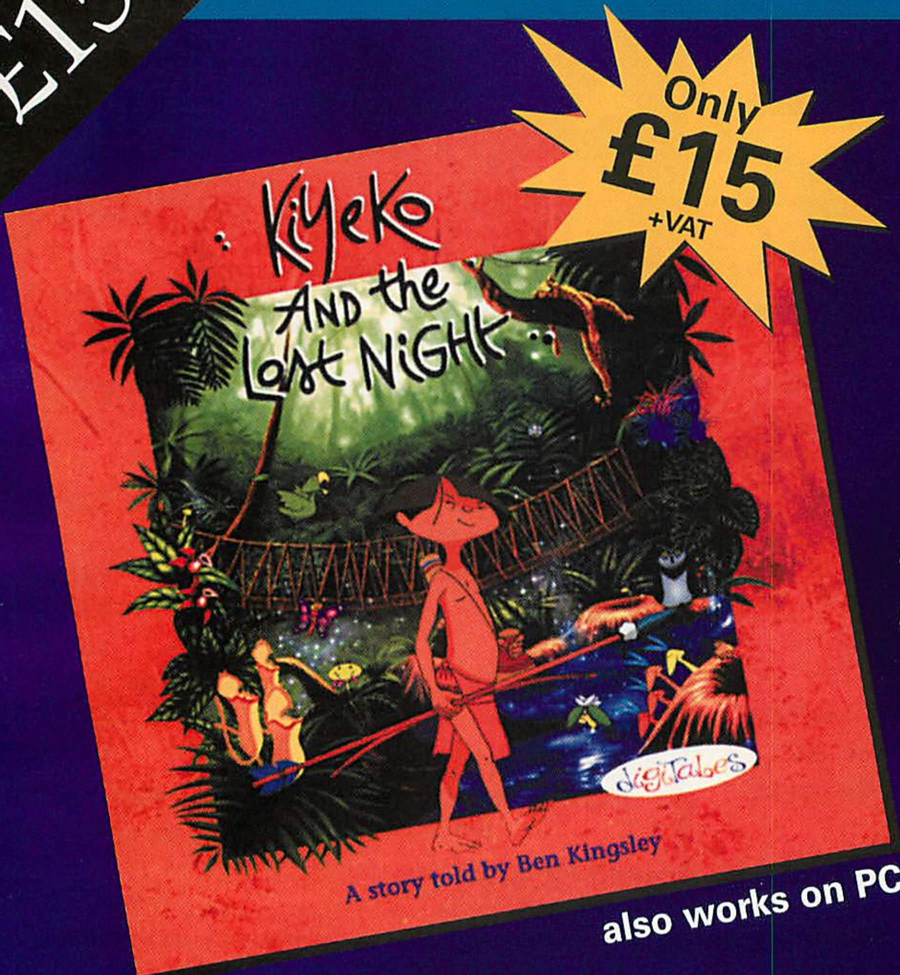
The expansion pack version of the editor does include a feature to generate random maps. It's fair enough for you to use one of these random maps as a starting point for something greater but be warned, we'll know if you've generated a map and sent it straight to us without modification!

A host of well known figures have agreed to share the burden of judging your efforts. Andrew Rawnsley, head man at R-Comp, the publishers of the RISC OS version of *Heroes of Might and Magic II* and Richard Hallas will be taking part along with Tim Fountain of Acorn Arcade fame and my good self.

Send your entries either by post to the usual editorial address (Acorn User, 26 Stockport Village, Hooper St, Stockport SK1 1DQ) or by e-mail to games@acornuser.com by 30th April 2000 for inclusion in the judging. All entries received will be included on a future cover CD and entrants are welcome to submit more than one map. Please include the following information with your entry: your name; postal address; e-mail address; map name; plus a brief summary of your map. END

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Solid state art

Max Palmer investigates materials and their properties

This month we will continue from where we finished off last month – examining the features of *TopModel*'s Attributes window. We've already looked at the 'Textures' tab and have seen how to apply textures in various mapping modes. However, we have not yet explored either the 'Colour and Materials' or the 'Various' tabs.

To recap, the attributes window lists the available display properties for a polygon or set of polygons. The term 'properties' covers a diverse range of options, from simple attributes such as colour, to more complex features, like the surface properties. For example, how the object reflects light, whether the surface is transparent and the mode in which the object is rendered. These properties are split into three main groups, each of which has its own tab within the attributes window (Figure I).

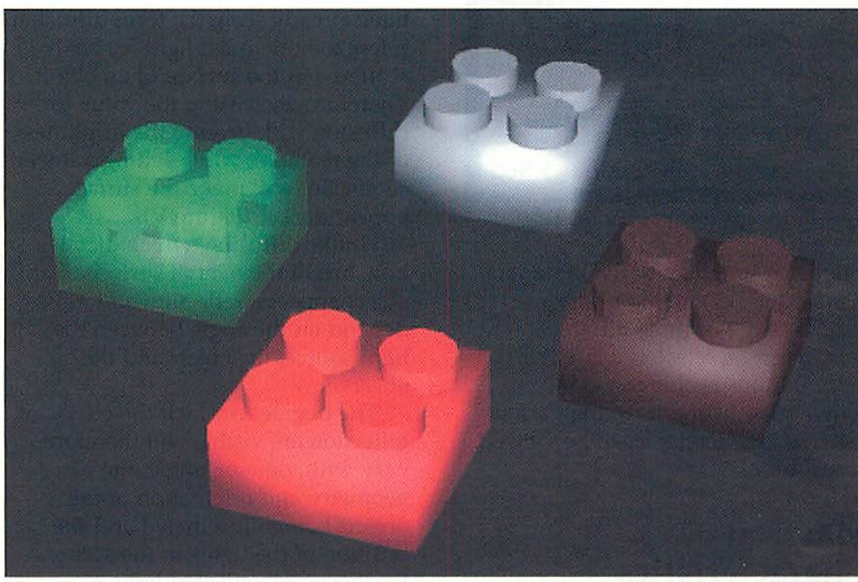


Figure II: Example materials applied to blocks – glass (green), plastic (red), metal (silver) and wood (brown)

Material Worlds

Focusing first on the 'Colour and Materials tab' (Figure I.B), we see that *TopModel* splits the window into two main sections. The upper portion allows the user to select and apply a named colour to the current selection, while the lower section provides access to a range of pre-defined types of material, such as glass, metal, plastic and wood (Figure II). The presets should be sufficient to cover most everyday modelling needs, however, if you decide that those listed don't produce quite the look that you're after you can opt to define your own materials and colours using an existing type as the starting point.

While creating a new colour simply involves selecting a set of RGB (Red/Green/Blue) values, defining a new type of material is more complicated and is carried out using the 'Material's Characteristics' dialog box (Figure III). This dialog may be invoked by pressing the lower 'New' button in the 'Colour and Materials' tab.

A quick examination of the dialog reveals that a material is a collection of predefined properties that characterise how light interacts with the surface. These factors consist of the ambient colour, level of diffusion, reflection, gloss and properties that affect the object's transparency. While we are used to terms like reflection, the physical meaning of others such as diffusion and gloss might not be quite so familiar, meriting further investigation.

To help you achieve a particular look, the material dialog provides an



Figure I: Attributes dialog, showing the Texture (A), Colour & Material (B) and Various (C) tabs

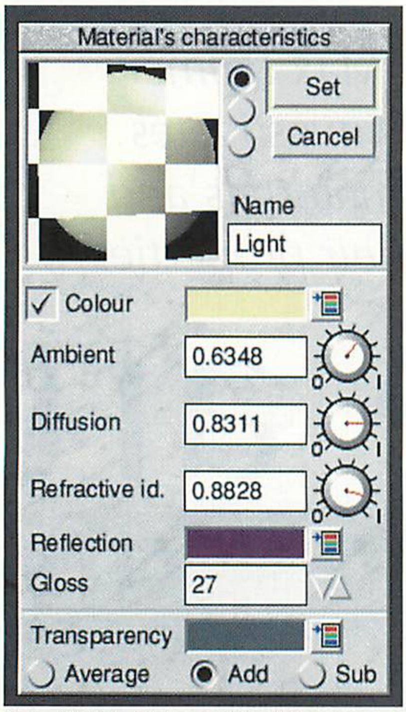


Figure III: Material characteristics dialog

interactive preview of the material being edited at the top of the window. One of three different objects can be selected using the radio buttons beside the view, allowing adjustments to the various material characteristics to be viewed in real time.

Material Characteristics

The uppermost material property in the dialog is the colour setting, which allows a preferred colour to be assigned using the checkbox and colour selector. This colour will replace the colour of an object at the time the material is applied; however, it can be overridden by applying a different colour later on.

One reason why you might want to define a material colour is if the material you wish to create is strongly associated with a particular colour – for example, brass. In this case it would be sensible to define a shade of brown as one of the material's properties, removing the need to select the colour each time the material is applied.

Below the colour selector is the rather mysteriously labelled 'Ambient' edit field. This defines the degree to which the surface diffuses (reflects evenly) ambient light (light which has no directional component). Since this property refers to ambient light you must have a source of ambient light within the current scene for this attribute to have any visible effect. This can be enabled using the 'SetUp Light parameters' menu (accessed by clicking on the torch icon).

For example, imagine you have a scene that contains a white object illuminated by green ambient light. If the material has a value of zero for the ambient setting, the surface will appear white or grey depending on the intensity of the other lights that are present. However, if the ambient setting for the material is increased (up to a maximum value of 1), the surface of the object will acquire a greenish hue, resulting from the diffusion of ambient light (Figure IV).

Below the ambient setting is the general setting for diffusion. As we have already seen, the term diffusion refers to how much light is evenly scattered at the surface of an object. Therefore, increasing the value for diffusion will increase the brightness of the material, while setting a lower coefficient will make the surface appear darker (Figure V).

Unlike diffusion, which dictates how bright the overall surface of an object appears, reflection and gloss depend on the angle between the light source, the object and the observer.

The degree to which the effects of reflection are visible will therefore vary with viewing angle, the geometry and orientation of the objects being illuminated and the position of the lights in the scene. Furthermore, reflected light is directly related to the colour of the original light source, unlike diffused light, which is the same colour as the

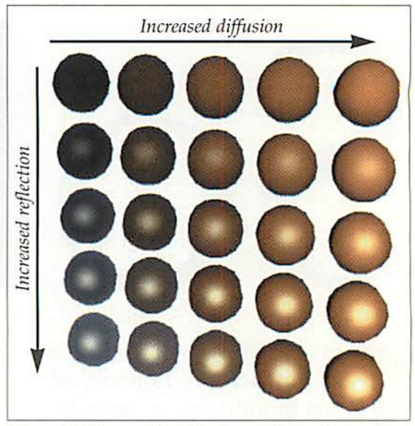


Figure V: Changes in diffusion and reflection

surface of the object. At this point it is worth restating that *TopModel* is not a full-blown raytracing package. As such, it is unable to simulate reflections that result from secondary sources of light, that is to say light scattered by an object is not treated a light source. This means that predefined materials such as the 'mirror' type will not act like a mirror in the real-world sense – you will not see an image of the reflected scene.

However, both the Phong and Gouraud rendering models are designed to simulate effect of primary reflections (reflections from light sources placed within a scene, such as the front light). In addition, interpolation of the light intensity between vertices (points) is used to make surfaces appear smooth. As a result, a rendered image produced by *TopModel* may differ quite dramatically from that created using

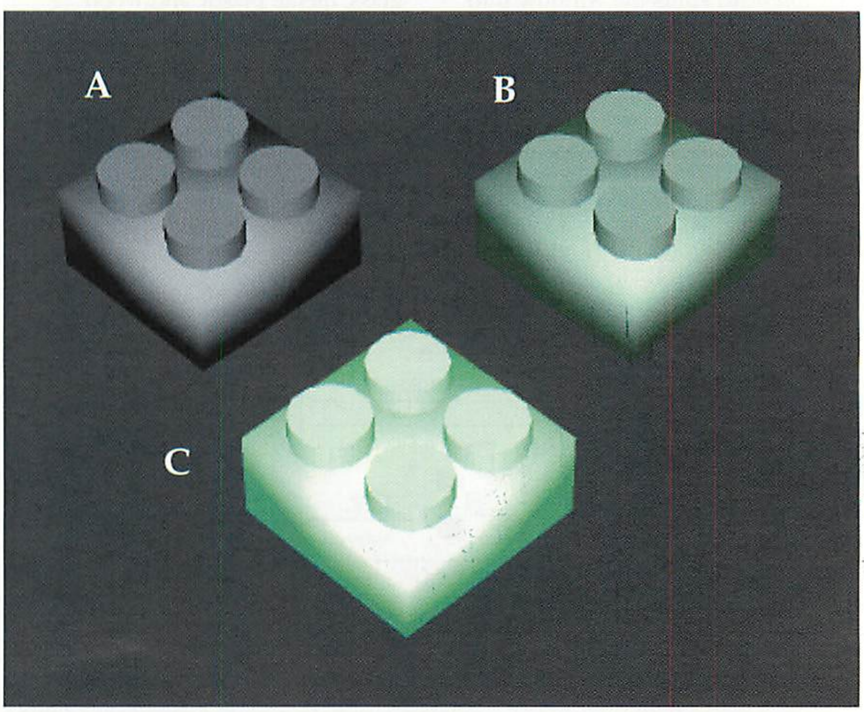


Figure IV: Effect of changes to the ambient property on the appearance of a block illuminated by green, ambient light

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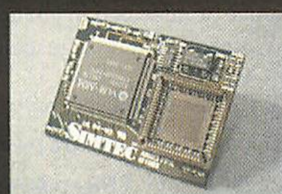
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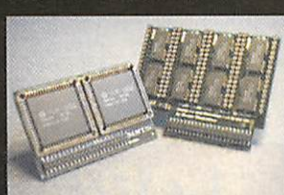
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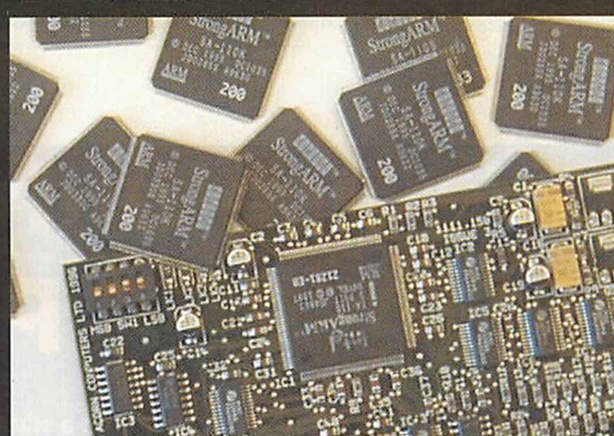
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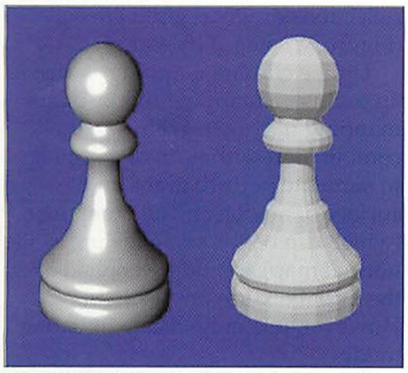


Figure VI: The Phong rendering technique can be used to make objects appear smoother than a raytraced image of the same mesh

a raytracing package (Figure VI), but will be rendered more quickly.

TopModel uses an RGB value to specify how light is reflected from a surface. This is because light of different wavelengths may be absorbed by different amounts, depending on the chemical composition of the material. Increasing the reflection coefficients will result in brighter highlights, making the surface appear more metallic, while adjustments to the value for gloss will alter the size of the specular highlight. For example, a large value for gloss (50-64) will produce small, intense specular highlights, while a small value (1-5) will produce diffuse highlights. This effect is demonstrated in Figure VII.

Transparency

Lastly, TopModel provides options for creating transparent materials. Like reflection, the degree to which an object is transparent may depend on the colour (wavelength) of the light, because of this transparent materials are defined using an RGB value. Each coefficient describes the extent to which the material is transparent to red, green and blue light.

One important physical property that is associated with transparent materials is the refractive index. This value defines the extent by which light is refracted (bent) as it passes from one medium to another. Although changes in refractive index produce visible changes in the appearance of a surface within *TopModel* (Figure VIII), these differences are not as dramatic as those produced using a raytracing engine which is able to trace the path of light through a scene (Figure IX). However, for completeness, the refractive index should be set to a known value for the material being simulated, since it is always possible you may wish to export the scene at a later date.

Once you are happy with the settings for the new material, you should enter an appropriate name in the name field and press 'Set' to create it. The new material can be selected from a list of user-defined materials by clicking with Adjust on the list icon, as opposed to using Select which will bring up the list of default materials. Finally, materials and colours can be exported using the new resources manager, which also handles views and paths. This can be invoked by clicking Menu when over the icon for the material or colour lists.

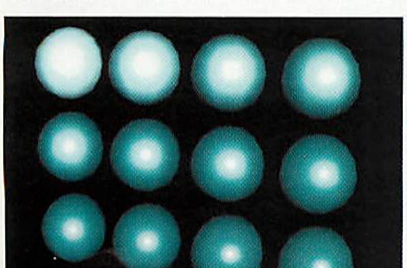


Figure VII: The value for gloss influences the size of specular highlights

The Various tab

The third tab on the attribute dialog is labelled 'Various' and provides a mechanism for setting a local view style. This style will override the currently selected view mode, be it either Phong, Gouraud, flat-shaded or wireframe.

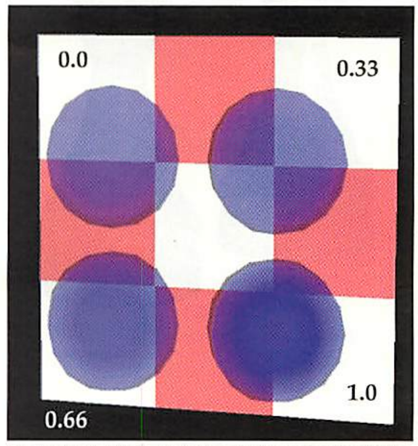


Figure VIII: Different values for the refractive index produce subtle visual effects within TopModel

The pane consists of six buttons that are paired horizontally to form three choices. The buttons on the right represent the default render styles that will be applied (when in the correct mode), while the buttons on the left provide options to select a 'local' render style. A few examples of the various render styles are shown in Figure X.

- The wireframe/solid option [A] can be used to force an object to be rendered as a wireframe model, regardless of the currently selected view mode. This option is

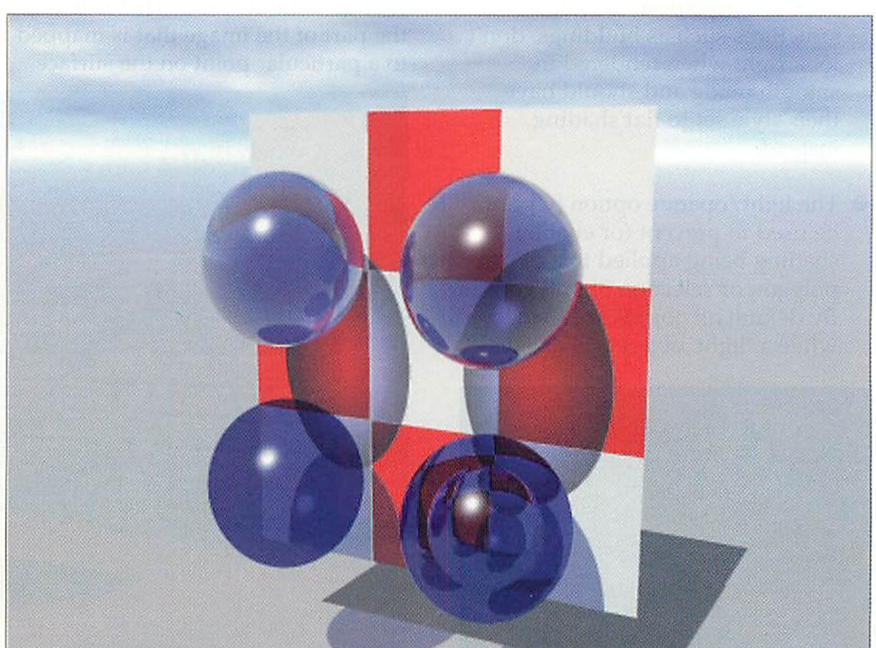


Figure IX: Raytraced spheres with different refractive index values

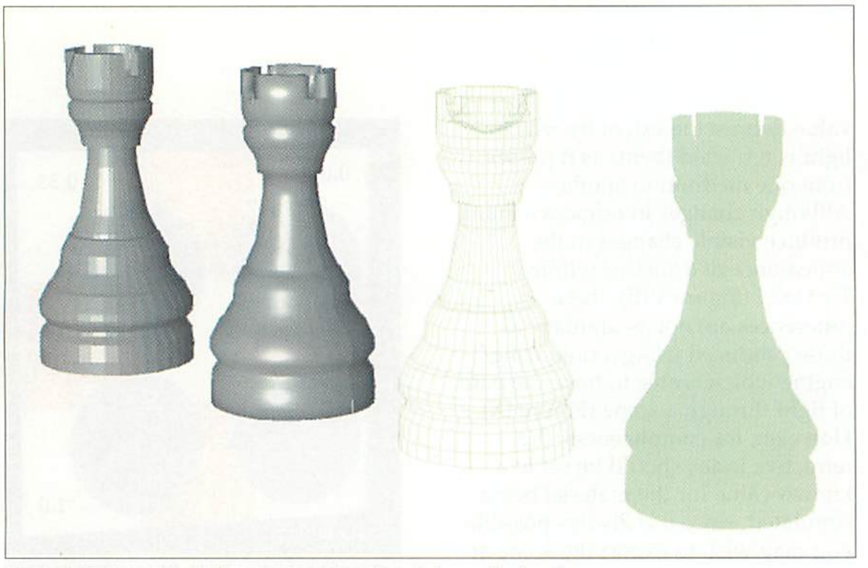


Figure X: Flat, smooth, wireframe and light 'local' rendering modes in action

extremely useful for working with complex scenes, since it allows objects that are not currently being worked upon to be redrawn more rapidly, making the modelling environment more responsive.

- The flat/smooth option [B] is used to select whether the light level at a point on the surface of a polygon is fixed, or is calculated by interpolating between the values at the vertices. The latter is a rendering 'trick' that is used during Phong or Gouraud shading to create the illusion of a smooth surface from what might be an otherwise sparsely sampled mesh. However, certain types of objects, particularly angular structures such as buildings, don't look right when rendered in smooth mode and should have their style set to flat shading instead.

- The light/opaque option [C] can be used to prevent (or enable) shading being applied to a polygon or selection of polygons. By default all objects are shaded, while a 'light' object will always appear bright, regardless of its location and the intensity and position of the lights in the scene.

Chrome bumpers

Last month we explored most of the options on the 'Textures' pane (Figure I.A). However, you might have noticed that I did not discuss any of the options which appear in the texture type list (normal, chrome and bump).

By default all textures are applied using the 'normal' mapping mode. However, *TopModel* provides two additional mapping modes, known as chrome and bump mapping. The first of these, 'chrome mapping', is a sort of random texture mapping mode, where the texture co-ordinates change with the view. That is to say, the part of the image that is mapped to a particular point on the surface alters as the viewing angle is changed. While this sounds a bit odd, chrome mapping is actually quite good at simulating metallic reflections or wood grain effects (Figure XI), hence its name.

Unlike chrome mapping, which is an exclusive mapping mode, bump mapping may be used in combination with normal mapping to simulate perturbations on the surface of an object. The bump map (which can be the same texture as the normal map) should be applied after the initial texture has been set. However, it is only visible in Phong mode.

When you apply a bump map you need to select its strength, which will affect how strongly the bump map influences the surface shading. Finally, the reason why bump maps are used so extensively is that they enable detail to be added to an otherwise flat surface, negating the need for extra geometric information. For example, a bump map can be used to emphasise the differences in height between the bricks and mortar in a texture map, making the shading of a brick wall appear more realistic (Figure XII).

Tricking the light fantastic

All this talk of texture mapping and creating new materials is all very well, but how are they used? Giancarlo, the author of *TopModel*, at Risc OS 99, demonstrated one of the most impressive uses of a new material type I have come across. I happened to be walking past the Spacetech stand when I noticed what

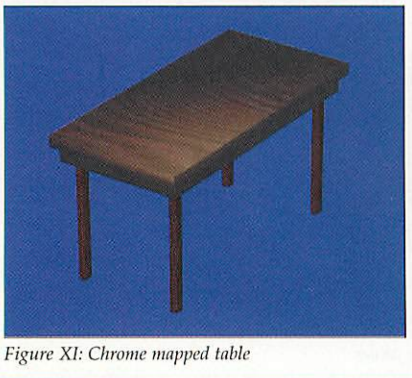


Figure XI: Chrome mapped table

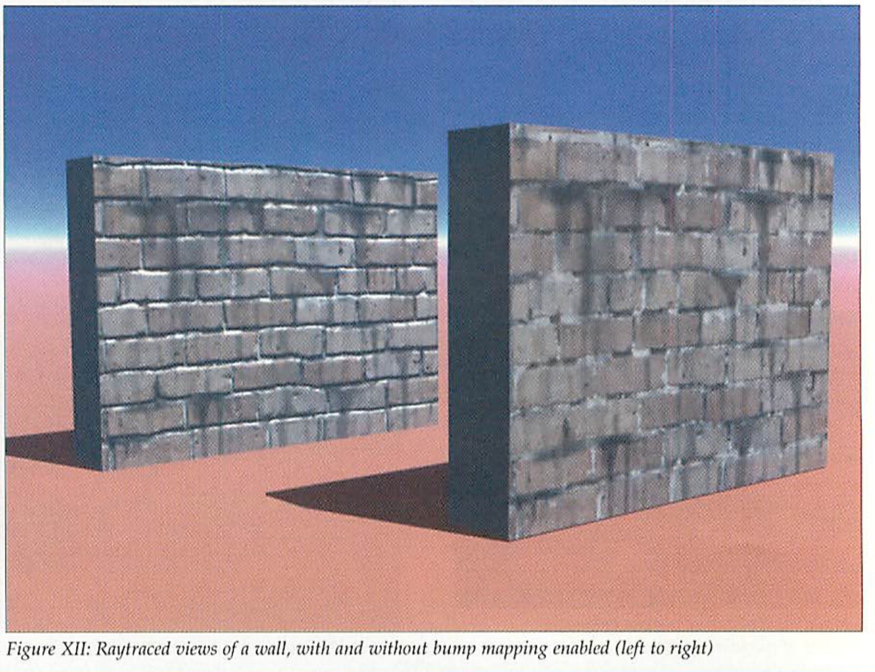
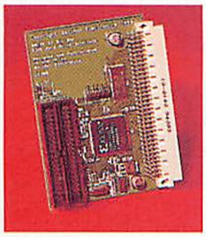


Figure XII: Raytraced views of a wall, with and without bump mapping enabled (left to right)

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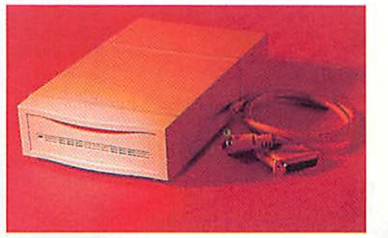
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20.0GB IBM	5400 rpm	9.0ms	MDDSIBIDE20	£ 157.00
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6.4GB Seagate + Awe	5400	9.5ms	MDDSSGIDE64A	£ 215.00
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13.2GB Seagate + Awe	5400	9.5ms	MDDSSGIDE132A	£ 243.00
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20.0GB IBM + Awesome	5400	9.0ms	MDDSIBIDE20A	£ 274.00
25.0GB IBM + Awesome	5400	9.0ms	MDDSIBIDE25A	£ 312.00
37.0GB IBM + Awesome	5400	9.0ms	MDDSIBIDE37A	£ 404.00
13.6GB IBM + Awesome	7200	9.0ms	MDDSIBIDE136A	£ 285.00
22.0GB IBM + Awesome	7200	9.0ms	MDDSIBIDE22A	£ 317.00
27.0GB IBM + Awesome	7200	9.0ms	MDDSIBIDE27A	£ 374.00
34.0GB IBM + Awesome	7200	9.0ms	MDDSIBIDE34A	£ 448.00

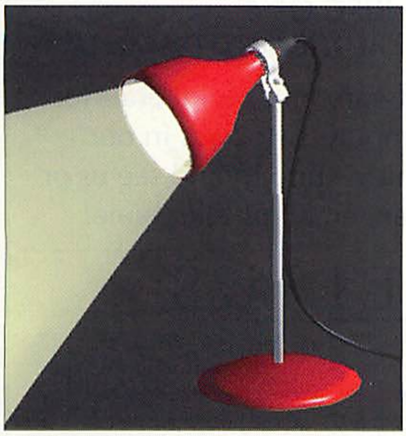


Figure XIII: Materials can be used to simulate visible light

I thought was a new type of view mode in action, demonstrating visible light effects.

It turned out I was sadly mistaken about the new rendering mode and had been duped by one of Giancarlo's custom material types. What he had done was create a transparent, yellowish material which had been applied to a cone radiating from a lamp he had placed in the scene. By setting the material properties to just the right levels, and illuminating the cone from the correct direction he created a very convincing (or at least, visually appealing) visible light cone. Inspired, I set about recreating this effect (Figure XIII).

First I created a model of a lamp using a couple of sweeps, an extruded outline, an extrusion along a path and a few carefully positioned cylinders. Next I created a cone and tilted it so that the apex of the cone lay at the back of the lamp. I then adjusted the width of the base until the sides of the cone exactly matched the width of the lamp at the 'exit' point, making the light source appeared collimated. Finally, I set about iteratively tweaking the parameters for a new material until I got the result I was looking for. The parameters for this material can be seen in Figure III.

It is worth noting that the key to achieving a realistic visible light cone lies not just in getting the parameters of the new material correct, but also depends heavily on the position of the viewer relative to the light in the scene.

It is also worth remembering that everyday materials are not 100% reflective or 100% black – so try to steer clear of using such extreme values. As ever, the physical world has a place in the design of our own virtual worlds.

Room with a View

We've seen this month how the attributes window allows you to control virtually all aspects that govern the new colours and materials, to the use of local rendering modes. In addition, the position of the viewer, the ambient light level and the location and orientation of lights within a scene have been shown to play a pivotal role in the appearance of the final, rendered image.

While *TopModel* has no native raytracing capability, with a bit of care and attention it can be used to produce some great looking final images. Figure XIV provides an overview of how the techniques described this month were used to create a room with a view, and not a raytracing engine in sight! Until next month, happy modelling...

END

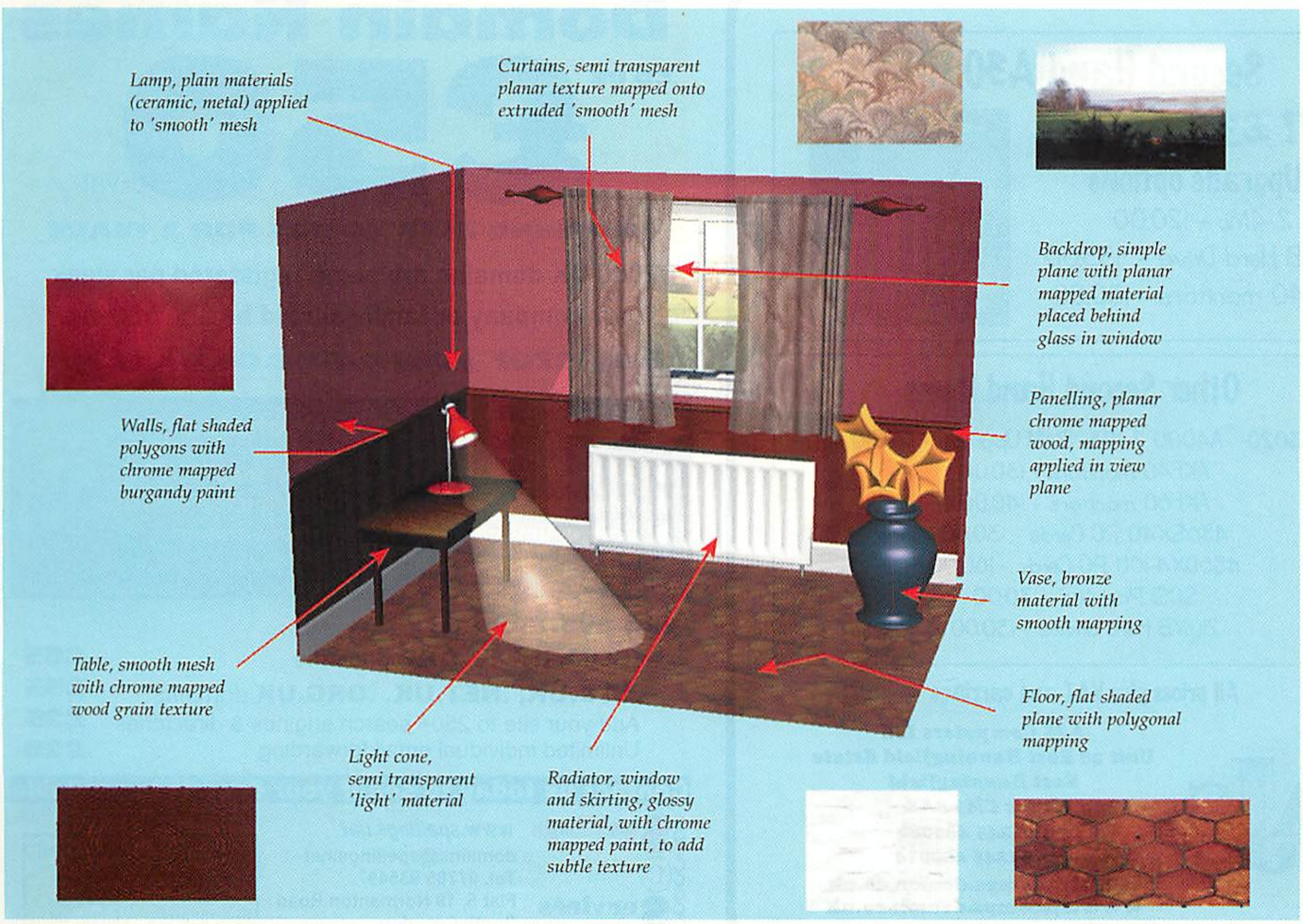


Figure XIV: Putting it all together – breakdown of a scene rendered by TopModel

Draw in outline

Simon Anthony learns his letters

Even after all these years there is yet more that can be done with *Draw* and a bit of know-how. I was recently asked how to make outlined letters and numbers, easy I thought. And it is, but only when you know.

You probably have outline fonts in your Font directory already, but even if you do, they will not always be the ones you want. You may wish for special effects, colouring each letter differently for example, or even having letters outlined in colour. This cannot be done with standard Fonts but it's easy for any other 'drawn' object created in *Draw* because of the fundamental differences between Fonts and Paths.

Font files can be thought of as small programs which *Draw* runs in order to produce the letter shapes. Each Font has its own program or, more accurately, data file. Certain variables can be controlled: width, height, foreground and background colour and also the overall displayed angle of text. But line colour, width and so on cannot be got at in a Font but they can in a Path.

Paths can also be thought of as programs, but they use different

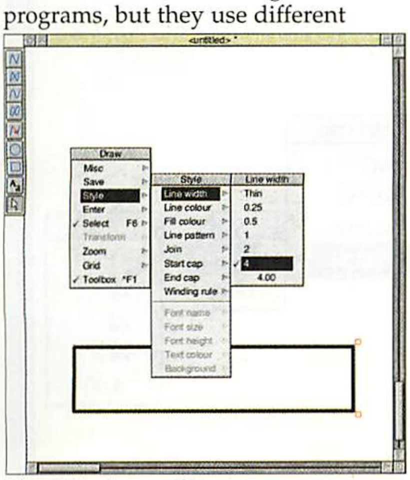


Figure I: Creating a path

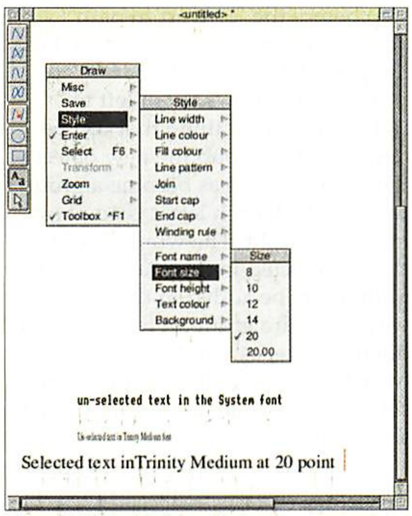


Figure II: Text selection options

variables produce their output differently and it's you that makes them using *Draw* itself. When you save a Drawfile, each object in it is stored as a set of data which, when run in *Draw*, produces the picture. By altering the variables of size and so on the picture can be seen at any scale with no loss of quality.

Normal paths

Have a look at Figure I, the 'rectangle entry mode' tool has been selected – it could have been any of the tools but each selection would result in a different range of options shown as available in the main Draw menu. In this example the text options in the Style menu are not available as no text object or tool has been selected.

The 'Line width' option is available however and this is shown leading to the 'Line width' submenu. Here the width option is shown set to a value of four points. The default 'Thin' setting is one pixel wide no matter what the screen magnification may be – the thinnest line that can be achieved on screen. Any other width will look wider as you zoom in or otherwise magnify the display. 'Line colour', 'Fill colour' and 'Line pattern' can be altered the same way.

Figure II shows what options are available when text is selected. In this situation text is actually being entered – as is shown by the cursor at the end of the third line of text. Each line is a separate *Draw* object and has to be treated individually (unless it forms part of a group). Any changes to the menu options will only affect the currently selected text object. In Figure II, the font has been set to be Trinity Medium and the font size is shown set at 20 points. (A point is 1/76th of an inch.)

The text cursor is only displayed when you have text mode selected

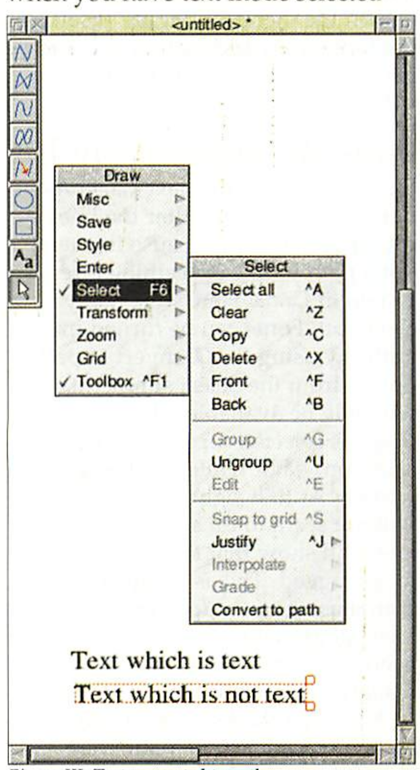


Figure III: Text converted to paths

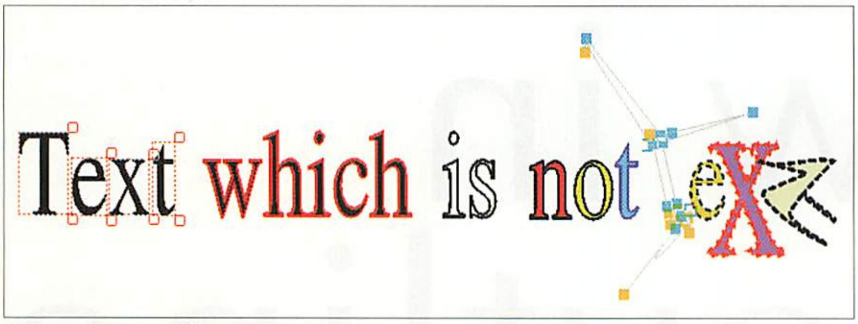


Figure IV: A montage of effects you can bring to text

and you click in the *Draw* window, until then anything you type won't know where to go and so nothing will turn up on the screen. Once you have caught the attention of a *Draw* window by clicking on it the title bar of that particular window will go yellow as in Figure II and you can work in it. If you now type something it will be in the default system font – that is the one used by the desktop on early machines.

The top line of text in Figure II is displayed in the 'System' font which is what happens when the Text icon is clicked without ever going through the menus. If you want that then fine, but if you now change the font it will end up looking like line two – all squashed up. This is because the new font takes the size attributes of the old one – here the System font's height of 12.8 and size of 6.4 which makes the Trinity font look rotten. That is why I have shown the menus in Figure II setting the font size (which sets width and height at the same time to the same value).

Now the interesting bit

Figure III shows the next stage. As I have said, you can't alter the line or fill aspects of text, because it is text, not a path unlike everything else drawn in *Draw*. Here's the really clever bit: Fonts can be turned into paths by using the 'Convert to path' option from the Select submenu. This will only be available when a text object is selected (or is part of a selection) – not while it is being written. At first sight a single click will not seem to do a lot, but a closer look will show that the text now looks ragged. This is because the anti-aliasing of the font which we have all grown so used to seeing has been lost. It now looks like an old PC display, nasty isn't it?

Now that the text is no longer a text object but a *Draw* path, the line/fill/pattern options are available again but the text cannot now be edited nor can the font be changed. To get back undo the action by pressing F8 repeatedly until the step before the 'convert to path' action was run. If you step back too far, press F9 to re-do it.

Figure IV shows, from left to right, the kind of thing that can be done. First ungroup the new object – the original text has become a group within which each letter is an object in its own right. The word 'Text' is shown selected in this state. Now the outline can be added in the normal way, an entire group of letters can be done at once, as with the word 'which'. Here the line width has been set to two and the line colour (which was 'none') to red.

The word 'is' shows the fill colour being set to either white or none, in which case the letter is transparent. Note the ragged look of the outline here. Skipping 'not' – the letters of the last word 'text' have been edited dramatically. As the letters are now paths, the edit points which make them up can be moved to create strange and often unreadable results like the 't' shown being edited (this figure is a faked montage by the way). The last few letters show what can be done by altering the line pattern and adding end of line effects.

The 'e' uses a dotted line while the 'x' uses both a dotted line and arrow heads added to the start of each dot. Figure V shows the menu tree you require for this effect. The final letter 't' uses rounded start and end caps to a series of dots. By playing with these settings you could do quite a bit, but it's best not to if you want people to read it.

Going back to the 'is', this is rather craggy now that the anti-aliasing has been forfeited – although it will look okay printed out – but it can be put back with the help of an excellent piece of shareware. *InterGif* by Peter Hartley is available from the Internet at http://utter.chaos.org.uk/~pdh/software/intergif.htm and it's designed to create GIFs for use on Internet Web pages and one of the side effects is that you can send drawfiles to it and get them back as anti-aliased sprites if you want to. **END**

Contacting AU

Simon Anthony:
draw@acornuser.com

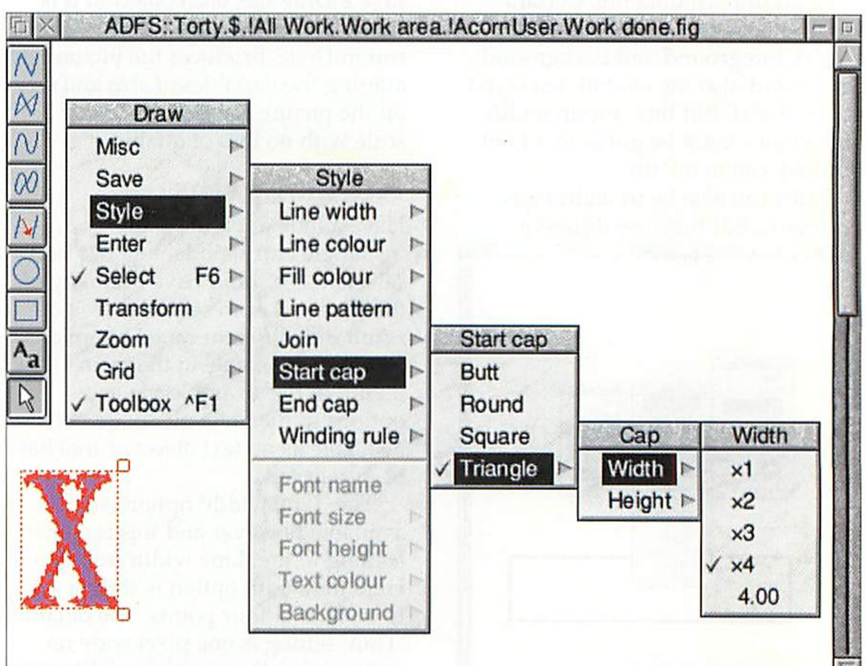


Figure V: How to do strange things to a letter

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RISC PC 233T DVD, RO4	£1091	R7500 Lite 17" monitor	£762.57
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A3000 1-4Mb	£41.12
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A5000 2-4Mb	£45.82
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A3010 1-2Mb	£10.57
A3010 1-4Mb	£45.82
A3020 2-4Mb	£34.07
A4000 2-4Mb	£34.07
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128Mb	£175.07	£175.07

*=High Clearance.

VRAM (RISC PC)

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1-2Mb u/g	£38.77
1Mb*	£21.15
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*For non-StrongARM machines

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NB Check out the Bargain Box below!

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120Mb	£45.82
170Mb	£52.87
210Mb	£57.57
340Mb	£61.10
510Mb	£69.32
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1.3Gb	£99.87
2.1Gb	£123.37
3.2Gb	£135.12
The A3020 will require partitioning software for drives larger than 510Mb	£29.37

Other drive sizes available. Part exchanges considered.

3.5" IDE A4000 A5000, A300, 440/1

420Mb	£32.90
540Mb	£41.12
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The A4000/A5000 require partitioning software for drives over 510Mb	£29.37

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540Mb	£41.12
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In order to use an IDE drive, the A3000, A3010, A300 and 400/1 machines require an IDE interface (i/f). The cost of this varies depending on the features required. Example price;
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BJC 4650 (A3)	£264.37
BJC6000	£205.62
BJC6100	£186.82
BJC7000	£245.57

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Parallel Zip ext	£99.87
SCSI Zip ext 250Mb	£151.57
250Mb ZIP cartridge	£14.68
Software parallel zip	£29.37
SCSI Jaz 1Gb ext	£222.07
100Mb Zip cartridge 10pk	£88.12
1Gb Jaz cartridge 3pk	£205.62

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21" Vision Master 502	£787.25
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Other types of monitor available from around £100.

A3000 & A5000

Special offers

A3000: Upgrade to a 170Mb hard drive for £76.37 and buy a 4Mb RAM upgrade for just £22.32

A5000: Upgrade to 8Mb and second 500Mb drive, £128.07

Other sizes of drive available. Offer subject to availability. Price includes collection, fitting and delivery. (UK mainland only).

Bargain Box

NB Many of the items in this section are second hand, and the list is constantly changing. Therefore please ring to check availability before placing an order.

3.5" IDE drives (Type, Qty, Price)

Type	Qty	Price
40Mb NEC	2	£11.75
50Mb Quantum	1	£12.92
60Mb Conner	1	£14.10
80Mb Western Digital	2	£17.62
110Mb Conner	1	£19.97
130Mb Seagate	2	£23.32
160Mb Seagate	2	£25.85
170Mb Seagate	1	£25.85
200Mb Conner	1	£30.55
200Mb Western Digital	2	£30.55
230Mb Conner	1	£31.72
250Mb Fujitsu	1	£35.25
250Mb IBM	2	£35.25
250Mb Western Digital	2	£35.25

An IDE interface suitable for most of the above drives can be purchased for only £29.37 when bought with one of the above drives. Larger units (>500Mb) may require partitioning software when used on pre-RISC PC machines. Please phone for details. A mounting bracket is an additional £1.76. Example price: 40Mb Seagate with interface and mounting bracket £42.88.

Various		Various Cont.	
586 PC card	£269.07	Backplane A7000	£45.82
Hewlett Packard SVGA monitor	£65.00	Risc PC PSU (Second user)	£70.50
Strong ARM inc RO3.7	£273.77	DATA Safe box & 8.4Gb	£175.07
Strong ARM inc RO4	£298.45	PC Keyboard	£17.62
170Mb Hard Disc for A310	£81.07	Keyboard encoder A300-A4000	£45.82
1-2Mb A3010	£10.57	PLCC extraction tool	£2.35
4Mb A3000 ram upgrade	£23.50	ROM extractor tool	£2.35
A3000 PSU	£17.62	56K modem	£57.57
Floppy drive	£23.50	Fan kit (300 series)	£8.22
Mouse A300-Risc PC	£14.10	Fan filters (pack of 5)	£3.52
Mouse A7000/A7000+	£17.62	486 clip-on cooling fan	£7.05
RISC OS 3.11	£29.37	Dongle Dangle	£7.05
RISC OS 3.70	£45.82	VIDC (New)	£34.07
RISC OS carrier board A300/400	£11.75	VIDC (Second user)	£8.22
Input/Output (I/O) card	£29.37	IOC (Second user)	£8.22
A5000 2-4Mb ram upgrade	£23.50	ARM3 25Mhz	£45.82
Backplane for Risc PC	£45.82	540Mb 3.5" SCSI drive	£58.75

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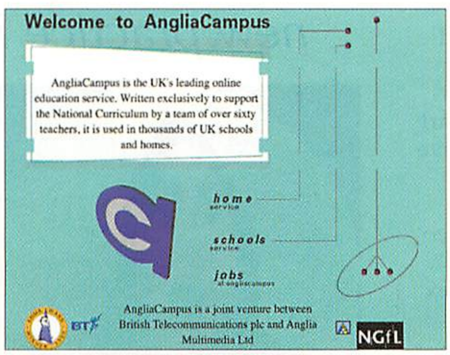
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Campus update

Anglia and BT's joint venture, Anglia Campus is going from strength to strength adding new topics and monthly projects to their subscriptions sites for primary and secondary schools. So if the Hilltribes of Northern Thailand, (A-level Geography) with detailed statistics to analysis of social and working lives with a series of interactive exercises, and external links, doesn't appeal, then how about a chance to voice your opinions.

Discussion Boards is a new addition and is linked from the index and subject pages and a present is looking at key stage tests, truancy and the so-called 'Culture of Excuses' in schools highlighted by Chris Woodhead. Do you think the Chief Inspector of Schools in England's attack is justified? Do you have evidence to support or refute his criticisms? As well as reading more about the news stories you can add your own views to debates.

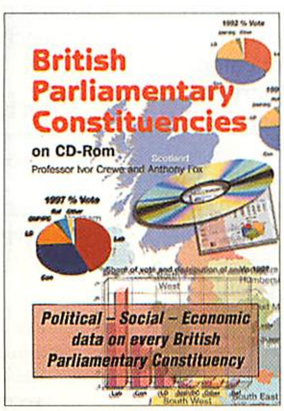
Staying with the news, Key Stage 3 and 4 now have News 8. Using a real-life story such as the Karen guerrillas crossing the border from Burma into Thailand, and taking control of a hospital in the hope of negotiating with the Thai government, News 8 explores the persecution of the Karen hilltribe by the Burmese government which lay behind these extraordinary events with information and interactive exercises. More information on all of these sites and projects can be found on **www.angliacampus.com**



Writing the constitution

If the US Primaries have left you longing for a parliamentary election here (only two years to go) why not swot up on your political knowledge with British Parliamentary Constituencies. This CD-ROM compiled by Professor Ivor Crewe and Anthony Fox, both of whom are distinguished political scientists and it provides political, social and economic data on every British parliamentary constituency.

This will be an important resource for A-level students, lecturers and politicians. What you get is an informed database of all Westminster constituencies based on the 1997 boundaries for England, Scotland, Wales and Northern Ireland, but more importantly you can see the national and regional voting trends, geographical location and administrative make-up of constituencies with their Press Association numbers, a profile of each constituency and its MP, as well as detailed voting changes, demographic, social and economic data for each constituency. This is available from Polemic Publishing (01242 604060) at £50.



In brief

Scotland on-line

Another educational web resource – Scottish Cultural Resources Access Network (SCRAN) which we featured last issues has added three new sites to this subscription service http://www.scran.ac.uk Hi-ways – The Highlands & Islands of Scotland information gateway is a result of the collaboration of various public sector organisations and agencies in the Highlands and Islands of Scotland under the European Union TITAN project and provides information on the Island communities, tourism, education, local services, employment, business, regional news, transport, health, environment, sport, Gaelic, history, arts and emergency services. One nice touch is that you can personalise your access when you register allowing you to build up a directory of links, receive news alerts from public agencies, send post cards, built up a list of contacts and so on.

Second is Think Net, a discussion forum, encouraging people to look to the future in the Highlands, the problems communities face and how they can be tackled. Concentrating on specific subjects which will impact on the area in the next 20 years, the current topic is climate change.

Finally, SCRAN have launched a Scottish Writers Web site which accompanies the Scottish Library Association's Scottish Writers Project, which with lottery grant aid through the Scottish Arts Council, is placing multiple copies of 36 different Scottish books in 400 secondary school libraries. The project is also supported by a CD-ROM.

The Web site has two versions, text and flash, the latter including video interviews with writers such as Alan Spence and Tom Pow who is also the "writer in residence" on the site. There will also be a series of "featured authors" (the first being Des Dillon), who will answer e-mail queries about writing. This site features short stories and novels, the SCRAN site already contains 200 downloadable audio files of Scottish poets reading their work.

ICT – a tool for all

Pam Turnbull looks at a new CD-ROM which aims to encourage and develop new practice in ICT art and design

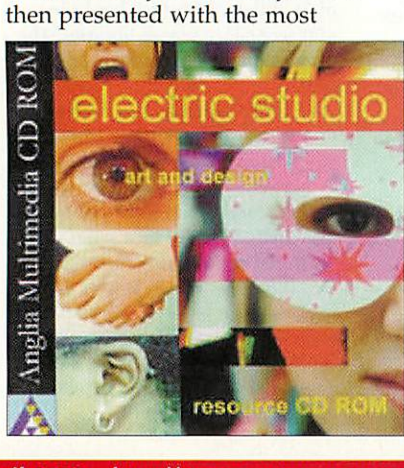
Curious publication this, which addresses the issue of using the latest technology and art together in the average classroom. The aims of *Electric Studio* is to provide support for artists and designers who want to use computers as an artistic or design tool.

The CD-ROM started life as a catalogue of 180 personal photographs which were organised into the themes of leaves, flowers, textures, towers, doors and sites. These then developed into two research strands to support Art and ICT projects with groups of PGCE students, and to access how subject-specific ICT resources would help art teachers. Three years on and we have Electric Studio.

Access is via a web browser – your personal favourite or via Fresco which inhabits the CD-ROM – just load it and double-click on the index page. This in turn will take you to three main sections: United Kingdom, Brazil and Student's Examples.

UK provides you with a further choice of 21 categories from Animals, Boats, Body Language, Botanic Forms, Multicultural, Flowers, Found Objects, Leaves, Looking Closely, Mysterious Places, Secret Window, Sculptural Forms, Site Specific, Skeleton, Still Life, Towers, Vegetables to Zoomed images. There are around 30 images in each category.

Whatever your choice you are then presented with the most





amazing graphics, ink drawings of fantastical creatures, colour photographs of fishing vessels, people showing emotion, pieces of driftwood, broken scissors, caves, standing stones and so on in JPEG or TIF format.

The second section, *Brazil*, is further broken down into six categories: childhood, churches, doors and windows, places, reality and identity and finally, textures. Magnificent and intelligent colour, and black and white photography provide a discussion feature or starting point for a project. Furthermore you can see some of the work done by students from the UK, Holland and Brazil using these images.

The accompanying A4 booklet provides information for anyone wanting to run workshops or INSET days on Art and ICT. Based on seven actual workshops you can use these with teachers or PGCE students. The workshops give the aims, objectives, that were being addressed as well as the resources and how these (mostly 2-day workshops) were broken down. You can see the resource, how ICT was used to develop an idea and the finished piece of design which may be computer-based or use more traditional media such as paint or a mixture of the two.

Inspired you could follow the ideas and develop the ideas for use with the full range of pupils. To help you the booklet also includes information on assessment and a flow diagram showing the planning for progression across five stages starting with drawing freehand with a mouse to intranet community arts projects using local primary resource material.

The quality of the graphics is unquestionable and the booklet provides ideas and starting points for the most computer-phobic art teacher. END

Product details

Product:	Electric Studio – new practice in ICT art and design
Price:	£55
Supplier:	SCA (Anglia Multimedia), PO Box 18, Benfleet, Essex SS7 1AZ
Tel:	01268 755811
Fax:	01268 755811
E-mail:	scauk@aol.com
Web:	www.anglia.co.uk

All aboard

Let the computer take the strain with Sherston's new NNS-friendly software. Pam Turnbull reports

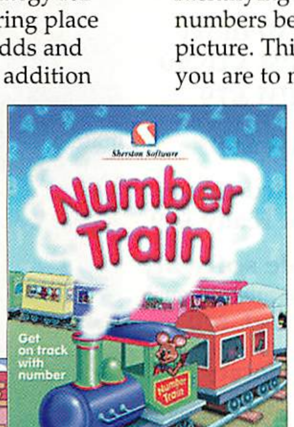
Number Train has not been tweaked to fit in with the National Numeracy Strategy, it has it at its heart. Large colourful graphics, written and narrated instructions with the option of hearing questions over and over again combine with three levels of difficulty and seven activities. These can be run from the CD-ROM or installed on to the hard disc.

The fun starts outside a cartoon train station with your guide, Murphy Mouse who, once his taxi has arrived and he's crossed the road safely, will explain just what is going on. A click away is a platform where standing with you are a group of animals all waiting for the Number Train.

The default setting has you waiting at Platform 2, but clicking on the Option sign allows you to opt for an easier or more challenging Platform number and here the teacher can choose to exclude some of the activities and restrict or increase the number of times you play an activity before choosing another one.

If the program is installed you can access the record-keeping facility which keeps a log of the activities each child completes, this doesn't give you information on how a child does or whether they tried and then left an activity before finishing. This is fine if you are working with an individual or group on the computer but I would have preferred a more information such as whether they needed help sometimes or each time.

The seven activities are based on the National Numeracy Strategy for Reception and Year 1; covering place value, ordering numbers, odds and evens to 20, counting in 2s, addition as combining 2 or 3 sets, addition as counting on and subtraction. As we've come to expect with Sherston products the CD-ROM, while self-explanatory and thorough, comes with an excellent manual. For instance, if you choose to work on place value, you'll meet the Scruffy Growlers who are off to a basketball match. The manual sets out the key teaching objectives for the activity at each of the three levels, so at Level Two you must read numbers 10 to 20 and know what each digit represents. You're then told what the children will be exposed to, in this case identifying and then partitioning tens or units in numbers 10 to 20, as well as hearing the vocabulary digit, tens, units and ones.





At the first level children are exposed to 0-20 and watch how the numeral is written while at the third level children answer five questions identifying tens and units/ones in numbers between 1 and 20 to reveal a picture. This information is vital if you are to make sure that the Numeracy lesson and the Number Train activities match up.

The activity is accessed by the children clicking on the characters on the Platform 2 (for Level 2), watching the train steam along before meeting the Growlers. Each is holding a ball and you must match the number on a ball to a list above. You're given two chances before the program explains and shows you what you need to do. The Growlers then disappear in a cloud to be replaced by place value cards and Diennes equipment differentiating between, and then combining, tens and units. This is very much in accordance with NNS practice and will support what is done in lessons. The Options menu permitting to you set how much practice a specific child needs on a specific activity.

Accompanying activities come a range of photocopiable Resource Sheets and the details of consolidating games children could play as well. In total there are 24 Resource Sheets and the games could be used as extension or plenary activities.

The other six activities follow a similar format, being well thought out, supportive, varied and fun. The use of vocabulary is important and I was struck by how this has been integrated into the program, in particular Level 3 with Drippy Duck and the range of subtraction vocabulary. As a small group activity Number Train works well and should not just be seen as an extension exercise. I wonder if Sherston can be persuaded to add a Shape Space and Measure Train to the tracks? **END**

Product details

Product:	Number Train
Ages:	4-6
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Fax:	(+44/0) 1666 843216
E-mail:	sales@sherston.co.uk
Web:	www.sherston.com

Rambles through Acorn Wood

Mike Cook goes into envelopes and video

Only a few problems this month but they all require a lot of explanation so let's get started right away. First off is Chris Webb, his problem needs to be licked (sorry):

Q "We are an envelope manufacturer based in South London. The envelopes we make go into boxes onto which is attached a label. These labels are run-off using an old converted Atari ST with a TEC-B30 thermal transfer printer. The Atari ST has done its job and is way past retirement. However, the printer is OK and has still got a few years left.

"I use an Acorn system at home and would like to introduce Acorns to my workplace – basically what I need to do is write a driver to enable the printer to be used by the Acorn. How do I go about writing one – I don't expect you to go into it in intricate details but perhaps you could point me in the right direction?"

A It all depends on exactly what you want to do. If you are running your own application either in the desktop or a single-tasking application you don't need a printer driver at all, just include the codes to run the printer in your application. The down side is that you can't use any other printer without changing the code.

If you don't have control over the software, you want to let other applications use your printer or you want to change the printer you use without changing the code, you do need a printer driver. The full details of this are covered in just over 100 pages in Volume 3 of the Programmers Reference Manual (which is soon to be released on CD) and it does get quite complex. However the system is modular and it may be that you can achieve what you want using a printer definition file.

This can be created quite simply using the *PrintEdit* application and basically involves filling in a form. This will only work if your printer is similar to an existing printer driver that takes the definition file. I would imagine that your printer is very similar to an old Epson dot-matrix printer for which drivers exist.

Finally if your printer is totally different you might have to write a full printer driver. The PRM says that Acorn can supply some of the source code that you require and advises you contact them. Nowadays this would be RISCOS Ltd.

Gareth Cumella – who assures me that he does know some things, honest – wants an explanation about colours on a computer:

Q "What I need information about, is bits. I know that bits are binary and eight bits make up one byte, but I have been intrigued to know how the bits work when it comes to the number of colours a computer can display. I have owned the *Iron Dignity* demo for a while now and if you have it, you will notice that its config file contains an option for 24-bit colour. What I cannot understand is how 16 million colours can be 24 bits. "According to the calculations I have done for my 2Mb of VRAM, 16 million is 16,000,000 bits, so what is this 24-bit? I have also been looking at the Web for this information and 8-bit being 256 colours is written all over it, but wasn't the BBC Micro an 8-bit machine and it couldn't display 256 colours, could it?"

A The number of colours is calculated by taking the number of bits per pixel and raising two to the power of this number. So 8 bits per pixel will give 2^8 = 256 colours. And 24 bits per pixel will give 2^24 = 16,777,216, which is close to 16 million. Of course you can't display all those colours on the screen at once because there aren't enough pixels but each one could be any one of 16 million colours.

When it comes to the BBC Micro you are mixing up the processor size, 8 bits for a BBC Micro, and the width (in bits) of the video memory which gives you the number of colours. On the BBC Micro each byte of memory was used for two pixels (in mode 2) which meant that there were four bits to define each pixel. This gave a theoretical 16 possible colours per pixel.

However, this was put through a hardware colour look-up table and the extra 8 colours assigned to flashing colours. This was because it was only a digital video system, that is the red, green and blue guns were either on or off, so there were really only eight colours the monitors could show anyway.

On the ARM processor machines, before the Risc PC, although they

could show 256 different colours they were not true 8-bit colour machines, because the hardware look-up table was not big enough to cope with an entry for each pixel value. This meant that the 256 colours were fixed and could not be altered by programming.

On the Risc PC these colours can be programmed although the operating system makes it difficult. With a 24-bit colour mode the computer actually uses 32-bits per pixel, the extra 8 bits are unused, this makes the hardware simpler. In a 24-bit mode there is no look-up table, the brightness of each gun is directly controlled by the bits in each memory location. In the 16-bit mode (32,000 colours, work it out) only 5 bits are used per gun and so you can only get a 64-level scale per gun.

By the wonders of e-mail he was able to get back to me with a supplemental question:

Q "Thanks for your e-mail, it was most interesting and very helpful. Recently, when I spoke to one of my lecturers about this, he told me that monitors do in fact have a limit, I always thought it was the video card.

I was wondering, if monitors do have a limit that is not over 16 million colours, how do some video cards such as FMV (Full Motion Video) cards or RISC TV display their output in photo quality, as it looked to me like RISC TV was displaying more than a selection of 16 million.

"The other thing that is confusing me, is about these new 128-bit consoles like the Dreamcaster. I have seen incredible graphics from this machine's video sequences but the thing that is puzzling is that the output can be displayed on a simple TV. Whereas I have an SVGA monitor, a StrongARM 233 and 2Mb of VRAM, even with these specs my Risc PC would never be able to match the graphical power of the Dreamcaster. The reason I am saying this is because I reckon that due to the limit of a TV or monitor, the console can only display a selection from 16 million colours, like my Acorn."

A There are no limits on the number of colours that an analogue TV or analogue monitor can display. Unless that is, you are talking about the photon limit, but I assume that you are not interested in quantum mechanics here. The old digital monitors were restricted, to 8 or 16 colours, but this was a limitation of the digital nature of the electronics, not the monitor. The graphics produced by a Dreamcaster are no better than can be produced by a computer using a 24-bit colour display.

The graphics power of the console is derived from the fact that it can process data faster, this allows it to do more processing per second and so allows frames to have a lot of work done on them. This means that you can produce a fast smooth moving image. The quality of a still image would in fact be better on a computer screen because generally you have more spatial resolution, that is pixels. The 128 bits refers to the bandwidth of the processor not the graphics capability.

The reason the graphics are no better is that 24-bit colour resolution is, in fact, more than the human eye can detect. In fact the limit is just over 6 bits per colour, but not as much as 7. Therefore 6 + 6 + 6 = 18 bits per colour is all that is really needed, the extra bits just give headroom. So if you did have more than 16 million colours you wouldn't be able to tell anyway.

Now, before anyone says that professional systems can have 32 bits per colour, this is true, but it is only for headroom so that when you move between different colour models, as you have to when you want to print, what you see on the screen is closer to what you get on the paper. END

Finally, Ray Curry wants to upgrade his monitor but is having trouble:

Q "I have an A420/1 with a number of upgrades done on it. At present I use an Acorn AKF18 multiscan monitor which works OK, although I have had to mend it twice. I have obtained a second hand "Taxan MV789LR" monitor which should give a better display than the Acorn monitor. The problem is getting it to work with the Arc. I have tried using my existing adaptor lead but all I get is lock to horizontal sync but a rolling picture not locking to vertical sync, I have tried in different modes including VGA. "As the Arc has a composite sync output I made another lead with the horizontal and vertical sync linked at the monitor end, but this did not work either. The Acorn monitor seems to work with a connection to its horizontal sync pin only. Can a lead be made that will run the Taxan monitor or do I need some kind of sync separator circuit to split the sync signal before it enters the monitor.

"I do not have connector pin information for the Taxan and am assuming it is the same as other monitors. I have not checked but I assume there are no components in my original adaptor lead, it was supplied with the Acorn monitor and I have only checked it with a multimeter."

A Acorn computers are unique in that they can connect to more monitor types than any other computer. The down side to this is that you have to know what each monitor requires. There is a command *Configure Sync that accepts three different commands 0 – for vertical sync, 1 – for composite sync and Auto to automatically sense the sync requirements.

Unfortunately your A420 hasn't got the inputs to do this. In addition there is the *Configure MonitorType command, feed this with 3 for a VGA monitor and 4 for a Super VGA. There is more information in application note 249 on the last cover CD, this is in *Acorn_FTP.Documents.AppNotes*. If you make a mess hold down the zero key on the numeric keyboard as you power up and this will put you back with monitor type 0. Now your A420 has some links inside that you will need to change in order to get both types of syncs to the outside world.

First of all LK1, is normally set so that the south pair are made. Change this to the north pair and you will get horizontal sync from pin 4 of the video output. Then you need to make LK2, this will put the vertical sync out to pin 5, this link is not normally made so you will have to find a shorting link from somewhere. Finally make sure your lead has both lines connected to the monitor. Note these two links are labelled LK10 & 11 on the A310 and A440 models.

Contacting AU

Mike Cook:
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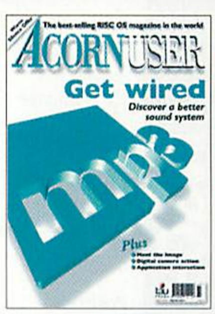
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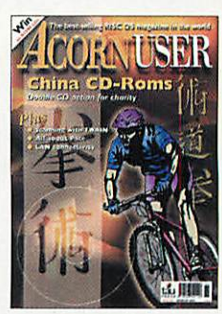
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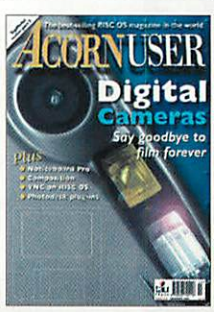
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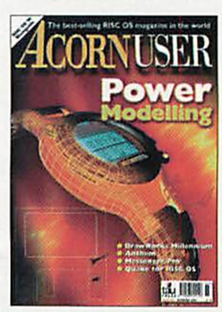
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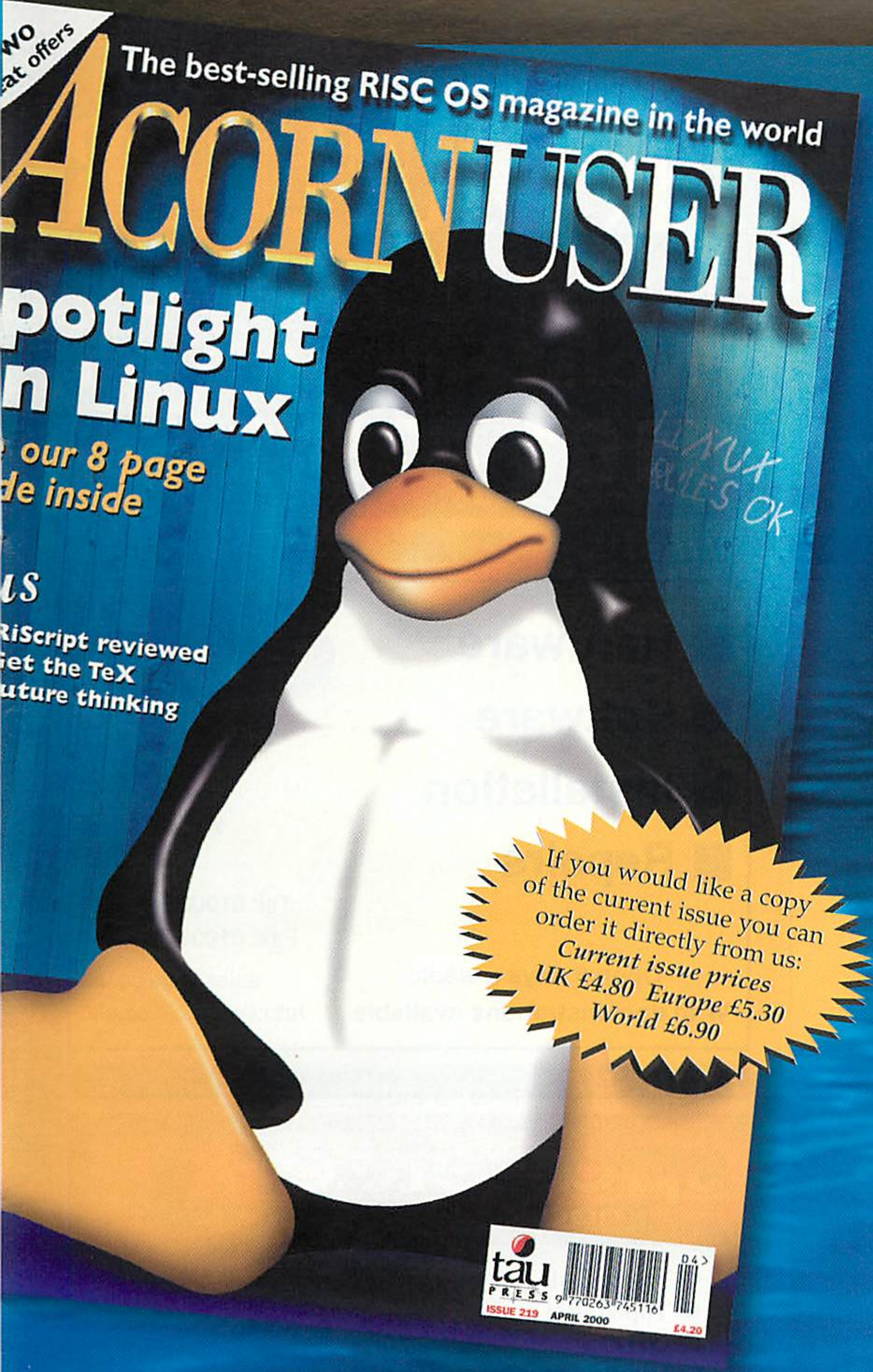
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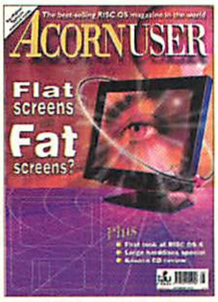
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Get switched on

Mike Cook takes control with the One Wire bus

Last month we saw how we could use the Dallas One Wire bus or microLAN to take a temperature with a One Wire thermometer. This month let's see how we can can take control with a digital input/output chip.

The DS2405 is called an addressable switch but not only can this device be made to act as an output it can also be coaxed into behaving as an input. If you have had a look at the data sheet for this device on the last cover CD, you might be forgiven if you gave up, it does seem a rather complex procedure for such a simple function. But never fear, I will guide you through its complexities.

The thing that makes it complex is that there is no command that will let you open or close a switch, only one that will toggle the switch, that is invert the open/closed state. Therefore it is essential to read the current value of the switch. This is done by using a "search" or "active search" command and those need to be done by using search trees as described in the second part of this series in February issue. However, as we have already done it, it is not too difficult to modify what we have.

Like many other One Wire devices this is a simple three-input device with ground, data and output pins. This output pin is referred to as a PIO pin in the data sheet because it can also be used as a programmable input/output.

Look at Figure I, this shows the internal structure of the device. At the heart of this is an FET or Field Effect Transistor. This acts like a switch, if the control signal is high, a logic one, the FET turns on and looks just like a 100R or so resistor. If however the control signal is off, then this FET acts like a very high resistor of over 10M and so is effectively a open circuit.

As this is behaving like a switch it doesn't actually output any voltage or logic levels only it's impedance changes. Now also on the PIO line is a sensor, this can be used to feed back the logic state of the PIO line, note here that if this line isn't connected to anything it will always report back a logic zero.

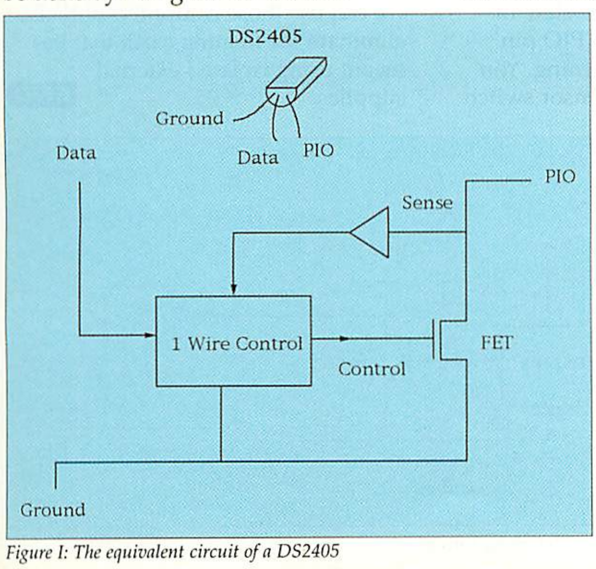


Figure I: The equivalent circuit of a DS2405

To see anything happen we need to connect it to a voltage through a load. As the interface we looked at in the first part (January issue) uses a floating earth any source of voltage to be switched must be floating with respect to the computer. This can be achieved by using batteries or floating power supplies like the battery eliminator. However, for test purposes, and some applications, we can use the data line itself as a source of power.

Figure II shows the sort of arrangement we can use. What we are doing here is taking some of the power from the data line and using it to charge a capacitor. When the data line goes down to zero the diode prevents the capacitor from draining out through the data line which gives enough power to supply the LED.

This can be turned on in two ways: by the switch in the DS2405 being turned on, or the external sensor switch. The addressable switch itself is limited to draining about 4mA, and note that the maximum voltage the PIO pin can be connected to is 6V.

So let's look at the software we need to drive this device. Basically the DS2405 responds to four of the One Wire bus commands: Reset, Search ROM, Match ROM and a new one "Active-only Search ROM". Therefore, in any system that uses this type of device we need to issue reset and search ROM commands to find out the serial numbers of the devices we have attached to our microLAN.

This proceeds as before by moving through a search tree to find all the devices connected to the bus. However, after an addressable switch is found further reading of the bus results in the reading of the logic state of the PIO pin, remember this will always be a zero if nothing is connected to pull it up. Issuing a match ROM command followed by the switch's serial number will result in the switch toggling.

That is, if it was closed it will open, if open it will be closed. All well and good but the last command is the one that is difficult to follow,

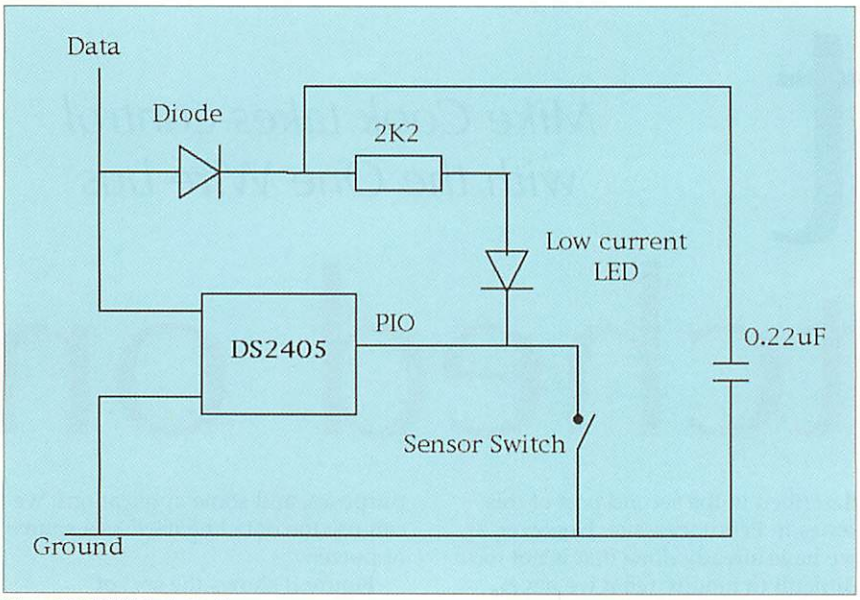


Figure II: DS2405 test circuit

"Active-only Search". This is very similar to the Search ROM command except it is only devices that have their switches closed, control at a logic one, that will take part. That is, if a device has its switch open it drops out of the search automatically, furthermore this means that any device found will always read back a one. The confusion here is over terms, if the switch is on it's control line is high or one, but the switch itself looks like a logic zero, that is it is connected to earth.

So the way to treat this command is to reverse the logic. This is best understood if you look at the test software I have written called *Test5*. Here I have kept the original search procedures but added another one called "aSearch". This additional procedure doesn't gather all the serial numbers it finds but gets them one at a time, reads the line to see what it is outputting and records the result.

Due to the nature of the "active search" you can sometimes get halfway through a search and find that all devices have dropped out and nothing is connected, when this is occurs there is no direct action you can take. Therefore, the procedure sets the open/closed flag to open before beginning the search and records each switch it finds as closed.

The bus is searched as before, and all the serial numbers stored in an array. Then the array is searched to find any addressable switches, that is those with array element zero equal to five and stores them in an array especially for addressable switches.

In this array is an extra element, number eight, that is used to store the state of the switch. Two bits are used, bit 0 stores the state of the PIO pin and bit 1 the inverse state of the control output. This results in both bits being set if the switch is open and both being clear if the switch is closed. So the switch reads 0 for closed and 3 for open, remember if you are using the test circuit in Figure II the LED will be on if the switch is closed and off if it is open.

So what's the point of this then? Well it's all to do with when the addressable switch is being used as an input. Suppose you wanted to read the state of the sensor switch in Figure II, if a Search ROM reveals the state of the PIO pin as zero you wouldn't know if that was because the sensor switch was closed or that the addressable switch was closed.

Now, with knowing the state of the control signal and the PIO pin you can tell what is happening. You get a reading of 3 if the sensor switch and the addressable switch is open and a reading of 1 if the sensor switch is closed and the addressable switch is open. In other words reading a value of 1 means you have set things up to be an input and something external is holding it down, therefore you are reading a logic zero on the addressable switches input.

The program *Test5* will allow you to open and close each switch on the bus. In addition, as the command to change the state of the addressable switch only toggles the state, if you want to close an already closed switch, the program looks at the stored state of the switch before deciding whether to toggle it's output.

Armed with these procedures you can turn any switch on or off and also read back the state of any switches you are using as inputs. As I said at the start it's not the simplest of procedures to write but, once written, it is fairly straightforward to control.

Now you have this, you could couple it to last month's project and make a temperature sensing system that did something about the results it found, like turning a heater on and off. Of course the addressable switch itself couldn't turn on a heater or open a radiator valve but it could drive a solid state relay that would switch the mains supply.

As these relays need a voltage input you could supply a passive pull-up supply as in the test circuit. However, looking through the catalogue some of these relays need in the order of 15mA to drive them, in which case you would need a small buffer circuit as shown in Figure III. Note here that when the One Wire switch is open the mains circuit is on.

So far we have concentrated on the One Wire interface that uses a true RS232 serial output, this precludes earlier computers that only had a +/- 5 volt serial output. Next month in the last of this series we will see how we can use those computers and also eliminate the floating earth that has meant using isolated external supplies. **END**

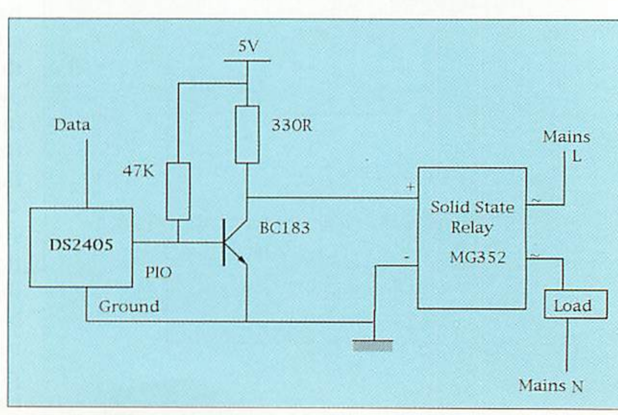


Figure III: Driving a mains relay

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Sound systems

My main backup storage device has been the 100Mb Zip disc on the parallel port of my Risc PC and although the Zip drive itself was relatively cheap additional Zip discs seem quite expensive so I always compressed files using *!Sparkfs* to get maximum data onto each disc. I have experienced that after some time some these Archive files have failed with a "Bad Header" error making it un-recoverable so looking for a better long term storage medium I have chose a CD ReWriter.

The initial outlay of £380 from Castle Technology for the Yamaha CRW 44162 ReWritable CD drive, the Storm DMA32 SCSI 2 Interface card and *CDBurn* seemed high but the cost of writable CDs is very cheap: a pack of 50 CDs for £50 (with no jewel cases) from John Lewis equates to 6.5Mb of storage for 1p or 5 CDs with cases for £6.50 equates to 5Mb for 1p all of which is excellent value.

Using my Irlam 24i16 audio/video digitiser to create large ARMovie Replay files from videos no longer creates a storage problem as once written to CD they can be replayed directly although only the drive on the SCSI bus seems fast enough to handle the data as the IDE 40X CD tends to loose it after a couple of seconds of playing video and audio.

Digitising audio led me to my next step of trying to create my own Audio CD from some of my old vinyl 12inch singles. I took the audio output from the Hi-Fi through the cassette recorder which I used to set the levels and out through its variable level headphone socket to the inputs of the Irlam card which digitised the sound to harddisc in ARMovie format. I have the problem that after each recording the *ReplayDIY* program which services the digitiser crashes but leaves the recording intact as a datafile so I just rename it and set its type to ARMovie.

The CD standard for audio is 44.1Khz, 16-bit stereo signed linear, little endian and I use *SoundCon* version 1.61 to convert from ARMovie to the CD standard. It does appears that when you select 'little endian' from the menu it actually chooses 'big endian' so you have to select 'bit endian' to get 'little endian'

From there I write all the digitised and converted tracks to CD using *CDBurn* and I now have a CD of some vinyl 12' singles all thanks to my Acorn StrongARM Risc PC .

Having played the CD on the Hi-Fi I do notice that the top end of the music does not seem to 'sparkle' as much as the original vinyl tracks do but I'm going to look into that.

Peter Hopkins
Peterborough

Countdown (again?)

In our school we were very fond of using a small utility called *Counter*. This could be set to show the time remaining to, or the time elapsed from, an important event. It could be set to show, for example, the number of minutes since the sinking of the Titanic, or seconds remaining to the next OFSTED inspection.

Unfortunately, since the Millennium, this utility doesn't calculate the time correctly. Does anyone know of a patch that can fix it?

Malcolm Brooke
Germany

RISC OS 4 compatibility

I must reply to Mr Hardwick in the Jan 2000 issue over my compatibility reports: Firstly, and most importantly – check the version number. Some of the versions which I have tested won't work on a SA machine, but will on an ARM710 with RISC OS 4. I included the version numbers as a large number of users (esp. in schools) may not have of upgraded to SA happy versions, and may therefore just be using a Risc PC with ARM610 or 710 inside.

Secondly, the responses from RISCOS Ltd should be read. When I initially started doing this back in May (it was the day after the Wakefield Show), the reports were sent to RISCOS Ltd for their verification. Some they agreed with, others they didn't – for instance, the reason why my PC card would not work was simple, a timing mismatch on the two SIMMs sockets, I swapped them around and the card worked.

Thirdly, I would say that the *vast* majority of all software tested ran – it was only the likes of the 4th Dimension and other software which used strange software protection or re-wrote parts of their code in situ to suit the machine which would cause a problem. Having checked all of Clares catalogue (and back catalogue), I can say that with the exception of *Fervour* (not StrongARM happy) and *Artisan*, even software such as *AlphaBase* will work.

Really speaking, unless the software was written specifically for RISC OS 2, or an ARM3 chipset, or is very very old (but that doesn't mean much as *AlphaBase* is ancient!) or OS 3.1 only, if it worked before, it should work now.

RISC OS 4 is amazing. It has breathed a new lease of life into my Risc PC. Don't delay, put your hand in your pocket and buy a copy today.

Paul (not on a commission) Johnson
St Helens

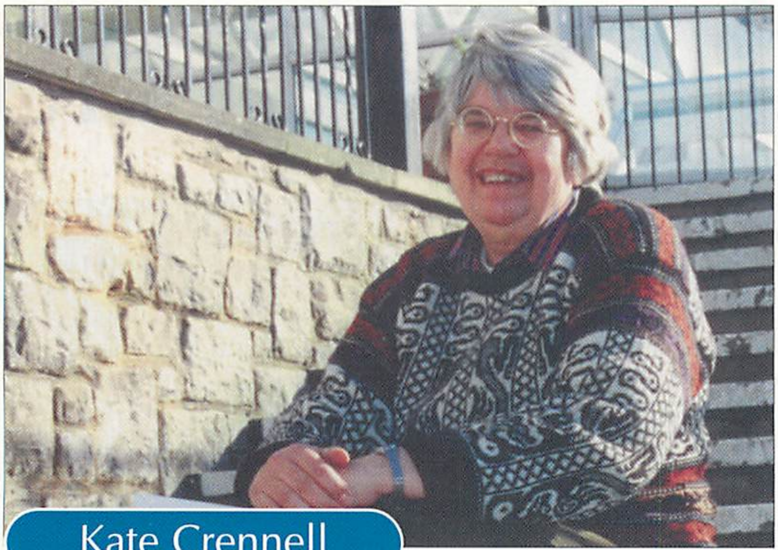
Urban myth

Contrary to what was stated in the MP3 article last month, under British law making even one copy of a copyrighted recording for your own personal use is illegal. Other countries like Holland allow you to do this but here it is not permitted. It's one of those urban myths.

The chances of being caught and prosecuted are small, just like exceeding the speed limit or dropping litter, but that by no means removes the illegality.

Contacting AU

letters@acornuser.com


Kate Crennell

It's nostalgia time. Remember the first car that you learned to drive in? The first album you bought? The first film you saw underage? Do you remember your first program? I do. I was at university and, this being a while ago, it was in Fortran. I therefore have a huge soft spot for the language and was delighted to have the opportunity of interviewing Kate Crennell, who runs Fortran Friends along with her husband David.

'We are interested in supporting Fortran,' enthuses Kate. 'We know that there are a lot of people doing Fortran programming out there, especially in big scientific applications. RISC OS machines are ideal workstations if only there was support for Fortran, so we are doing our bit and write applications using it'.

I am very good at editing paper tape

Kate's main interest is in crystallography; she publishes *Crystallograph News* – a quarterly newsletter for fellow crystallographers – which is done entirely using RISC OS machines.

'Fortran Friends is the interesting bit, but we also write mathematical programs for schools or for people who like to play with polyhedra. We have a very nice Millennium calendar which is a dodecahedron. David is interested in high-energy physics and the maths so we are both keen to get people to use scientific programs on RISC OS machines.'

In their spare time Kate and David indulge in a spot of campanology. Not only do they bell ring in real belfries, they've 'gone virtual' with bell-ringing software on RISC OS, which is definitely a first for me.

'Our village is raising money to mend the bells for the Millennium,' explains Kate. 'We are a sleepy little village and have not quite made it by the Millennium, but now I am into collecting bell-ringing programs for RISC OS machines as well as polyhedra and maths.'

It comes as no surprise to find that Kate has been programming for close to forty years, which is getting on for as long as there have been computers around to program.

'They were mainframes, with punched cards and tape. I am very good at editing paper tape. We used to have old paper tape readers that were not very reliable, and it was more difficult to punch out a three-inch-wide reel and get it all right than it was to edit the holes which were wrong. I used to know all the codes on the paper tapes; we have it a lot easier now with RISC OS.'

Kate and David often take a small stand at RISC OS shows; I actually caught up with her at the Acorn South West Show at the Webbington Hotel, Loxton.

'I think it is worth coming to shows like this to encourage people to program. I met somebody from four miles down the road who did not know that we could drive Fortran and she is going to come up. We are looking for more people to support Fortran and for manufacturers who will agree to let us have their products for the RISC OS platform. We would like to get the big suppliers of scientific libraries which go with Fortran to let us mount them on a RISC OS machine which they could then sell.

Kate and David bought a BBC Micro for their kids, for the same sort of reason fathers buy their children train sets.

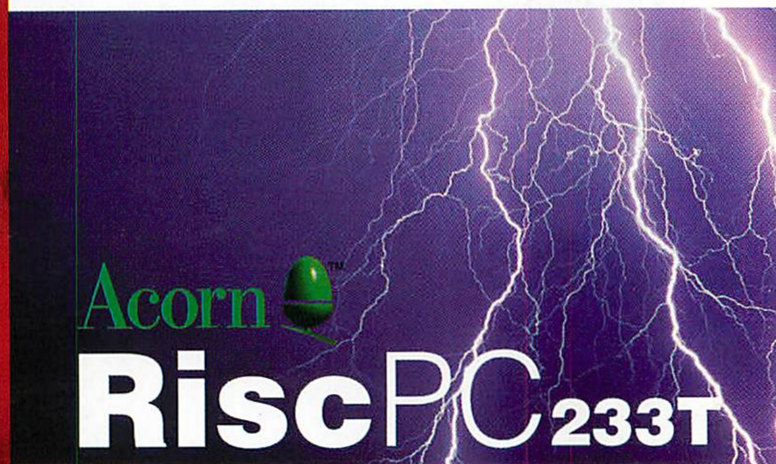
'As time went on we upgraded; we just stuck with it. I think it is better than Unix because Unix is a command line-based system whereas RISC OS has the desktop which is a very nice environment to work with and is much quicker than the rival Bill Gates' products. Linux is based on Unix and I do not get on with Unix because they seem to think it matters whether you type in upper or lower case. I am used to Vax VMS on big mainframes, which doesn't care whether you have upper or lower case, just as RISC OS doesn't.

'For the future... well, we have to get cooperation from someone to get a Fortran 90 compiler. We are wondering about OpenGL, a high-level graphics language invented by Sun. We might put OpenGL on RISC OS as well as any more scientific applications which people are interested in and want our help to maintain, so long as we can get a little bit of money to fund coming to events like this. Incidentally, I must take the opportunity to thank the organisers of this show who kindly allowed us space to demonstrate the glories of Fortran.'

Jill Regan

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